ANENCEPHALICS AS ORGAN DONORS: AN ANALYSIS AND APPLICATION OF THE ORIGINAL INTENT OF THE AD HOC COMMITTEE ON BRAIN DEATH

by
Neely Anne Towe Egan
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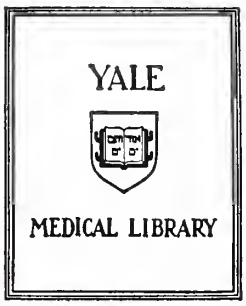
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ANENCEPHALICS AS ORGAN DONORS: AN ANALYSIS AND APPLICATION OF THE ORIGINAL INTENT OF THE AD HOC COMMITTEE ON BRAIN DEATH

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ABSTRACT

ANENCEPHALICS AS ORGANS DONORS: AN ANALYSIS AND APPLICATION OF THE ORIGINAL INTENT OF THE AD HOC COMMITTEE ON BRAIN DEATH.
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In 1968, the Harvard Ad Hoc Committee on Brain Death created the criteria to determine brain death and consequently revolutionized the practices of intensive medicine and organ transplantation. Since their drafting, the brain death criteria have been slightly adapted as advancements have been made in brain function measurements, but the basic requirements of loss of consciousness, responsiveness, spontaneous movements and breathing, and reflexes have been strictly adhered to despite much criticism. The most recent tide of criticism has surfaced in the debate over whether to use anencephalic infants as organ donors. The anencephalic is born without the cerebral hemispheres which would give the infant consciousness, responsiveness and voluntary movements, but is born with a brainstem which gives him or her spontaneous breathing and reflexes and thus is excluded from acceptance as a suitable organ donor under the brain death criteria. However, an analysis of the influences which surrounded the Ad Hoc Committee and a careful study of the unpublished papers of the Committee's chairman, Dr. Henry Beecher, and of the correspondence he conducted with members of the Committee reveals the true intent of the Ad Hoc Committee and that this intent is far from today's practice of the criteria of brain death. If the original intent of the Ad Hoc Committee on Brain Death were applied to the anencephalic, then the anencephalic could be accepted as a suitable organ donor.

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ANENCEPHALICS AS ORGAN DONORS: AN ANALYSIS AND APPLICATION OF THE ORIGINAL INTENT OF THE AD HOC COMMITTEE ON BRAIN DEATH

I. INTRODUCTION

"At death's door" is an expression which is used in everyday language to describe those who are about to die. It conjures up images of someone, frail and gaunt, night-gown clad, who is cautiously extending a toe over a threshold which, once crossed, will result in the irreversible transition from life into death. Until recently, physicians and society have recognized the threshold as the irreversible loss of spontaneous heartbeat and respiration. The advent of intensive care and resuscitative medicine, however, has confounded this transition. Death's threshold has become a shadowy region where functions, previously irreversible, can be lost and regained and lost again. In 1968, several physicians, lawyers and ethicists gathered to examine this threshold, to define death given the influences of modern medicine. This Ad Hoc Committee created criteria which, when present, indicated Brain Death. These criteria, not surprisingly, measured functions of the brain - consciousness, responsiveness, spontaneous movements and breathing, and reflexes. The formulation of the brain death criteria established the notion that the diagnosis of death required irreversible loss of consciousness, perception, and personality rather than the irreversible loss of vital bodily functions, such as heart beat and respiration, which could be maintained artificially. The image of someone stepping across a threshold was replaced with a split image of a body attached to

ventilators and I.V. lines and another fully animated image slipping furtively across that threshold.

Since their drafting, the brain death criteria have been slightly adapted as advancements have been made in brain function measurements, but the basic requirements of loss of consciousness, responsiveness, spontaneous movements and breathing, and reflexes have been strictly adhered to despite much criticism. The most recent tide of criticism has surfaced in the debate over whether to use anencephalic infants as organ donors. The anencephalic is born without the cerebral hemispheres which would give the infant consciousness, responsiveness and voluntary movements, but is born with a brainstem which gives him or her spontaneous breathing and reflexes. The infant's prognosis is grim; death from cardiorespiratory arrest usually within days. The anencephalic should be an ideal pediatric organ donor, but the manner in which anencephalic infants die deprives their hearts, livers and kidneys of oxygen and makes those organs unsuitable for transplantation. Parents of these infants as well as surgeons and legislators have called for the criteria of defining brain death to be altered or overlooked in order to use these infants as donors, in order to derive something good from an otherwise tragic situation. Thus far, no change has been made; the original brain death criteria are defended and followed to the letter.

It is my hypothesis that the Ad Hoc Committee of 1968, the drafters of the brain death criteria, intended a definition of death far from what is presently being defended in their name. I believe that the Committee failed to precisely outline both the problems they hoped they were solving and the intent of their criteria. This imprecision has created a definition of death which erroneously excludes the

anencephalic infant, which keeps the anencephalic infant waiting at death's door on the wrong side of the threshold. I intend to demonstrate that an analysis of the influences which surrounded the Committee and a careful study of the unpublished papers of the Committee's chairman, Dr. Henry Beecher, and of the correspondence he conducted with members of the Committee reveal the true intent of the Ad Hoc Committee,[a] and that this intent is far from today's practice of the criteria of brain death. In order to understand the brain death criteria's impact on the anencephalic debate and on the perception of death, I propose first to analyze the anencephalic organ donor issue; secondly, to trace the evolution of death's definition and diagnosis throughout history; and then to extract the true intent and significance of the Ad Hoc Committee's brain death criteria and juxtapose this intent on the anencephalic debate. I believe if the original intent of the Committee can be clarified and the significance of their definition appreciated, we will then accept anencephalics as suitable organ donors and be closer to understanding death's shadowy threshold.

II. THE ANENCEPHALIC DEBATE

In the past few years, medical interest in pediatric organ transplantation has rapidly expanded. Developments in immunosuppression and refinements in surgical techniques - particularly cardiac replacement in newborns - has created hope for some parents whose children have otherwise fatal heart, kidney, and liver disease, such as hypoplastic left heart syndrome, endocardial fibroelastosis, biliary atresia, congenital metabolic disorders which lead to liver failure and various causes of end stage renal disease. With this hope has come a concomitant increase in demand for usable pediatric cadaver organs. The estimated demand for hearts is 500 to 600 per year, for kidneys 300 to 450 per year and for livers 400 to 800 per year. But thus far, supply has fallen far short of demand; nationally, 30 to 50 percent of children under the age of two who are registered for transplantation die while waiting for donor hearts and livers to become available.(116, 185, 205) In older patients, cadaver organs for transplantation come primarily from the victims of accidents, especially auto and motorcycle collisions. Relatively few newborns and very young children die under these circumstances.(42) Furthermore, the vast majority of severely handicapped, dying neonates are not suitable for organ donation either because of their underlying disease or infection or because the life supports and drugs administered in newborn Intensive Care Units render their vital organs unsuitable.(60)

The search for organs has led investigators to target the organs of anencephalic infants. Anencephaly is a congenital, partial or complete, absence of the cranial vault as well as overlying tissues and varying

degrees of malformation and destruction of the exposed brain rudiments. Its genesis is in the first month of gestation. The primary abnormality is failure of cranial neurulation, the embryologic process that separates the precursors of the forebrain from amniotic fluid. There is subsequent destruction of the exposed tissue, producing a hemorrhagic, fibrotic mass of neurons and glia with no functional cerebral cortex and varying degrees of brainstem function.(93) The brainstem does allow for intact respiratory and circulatory function. Thus infants with anencephaly are permanently unconscious, yet they breathe spontaneously and their hearts beat at a regular rate and rhythm. These infants also display behaviors of brainstem origin, such as responses to noxious stimuli (avoidance, withdrawal or crying), feeding reflexes (rooting, sucking, or swallowing), respiratory reflexes (breathing, coughing or hiccups), and many interactions involving eye movements and facial expressions that are seen in newborns with intact cerebral hemispheres.(177) Experience with other cerebral lesions, such as persistent vegetative state (PVS) and locked-in syndrome, indicates that the suffering associated with noxious stimuli (pain) is a cerebral interpretation of the stimuli; therefore, infants with anencephaly presumably have no conscious experience of pain and cannot suffer.[b]

Although anencephalic infants have a slightly higher than normal incidence of anomalies in other organ systems (about 13 - 33%), most of their organs appear to be morphologically and functionally suitable for transplantation.(93) With an incidence of 0.3 per 1000 births, there are approximately 1050 infants born each year with anencephaly, two thirds of which are stillborn, leaving 375 which could be potential organ sources.(177)

Prenatal testing of alpha fetoprotein levels and subsequent high

resolution ultrasonography have dramatically increased the diagnosis of anencephaly in utero, and many anencephalic fetuses are aborted. No data are available to estimate the effect of more aggressive screening on the potential supply of organs from anencephalics.[c] But, nevertheless, the parents of at least 24 anencephalic newborns have sought to donate their infants organs through a program at Loma Linda University Medical Center and others have inquired at other medical centers.

The appearance of the infant with anencephaly is unique and the diagnosis can be made with virtual certainty when the following criteria are met; 1) a large portion of the skull is absent, 2) the scalp, which extends to the margin of the bone, is absent over the skull defect, 3) hemorrhagic, fibrotic tissue is exposed because of defects in the skull and scalp, and 4) recognizable cerebral hemispheres are absent. Errors in diagnosis have been described in the literature by surveillance programs and by the Task Force on Anencephaly in a survey of pediatric training programs. Scalp covered lesions such as those seen in cases of microcephaly, encephaloceles, atelencephaly, holoprosencephaly, and hydranencephaly do not meet the above criteria. Defects that do not extend to the anterior skull as in iniencephaly do not meet the criteria either.(93)

Most reported anencephalic infants have died within the first days after birth. In three large series by Baird and Sadovnick, Pomerance and Schifrin, and Melnick and Myrianthopoulos, survival beyond one week occurred in none, 5%, and 9% of such infants respectively. Survival for as long as 3 months and 14 months has been reported. However, these data are confounded by two problems; one, unusually long survival is often poorly documented with regard to the certainty of diagnosis of anencephaly; and two, early death may involve the decision to withhold varying degrees of

medical treatment which might have otherwise prolonged survival. Because of the lack of higher brain function, the anencephalic infant's respiratory system intermittently lapses with increasing frequency until respiration ceases entirely. In most cases cardiorespiratory arrest apparently occurs before the cessation of brainstem functions. This may be due to a variety of mechanisms including endocrine dysfunction, hypotension, hypopnea, aspiration, hypothermia or infection. Many of these complications, presumably, could be effectively treated but how long these infants could survive with standard neonatal intensive care is unknown.(20, 126, 147) Experience from Loma Linda with infants who were given maximal support showed that many became more vigorous and that most survived at least one week without loss of brainstem functions.(142)

Despite these clinical considerations, anencephalic infants remain potential sources of organs for transplantation for several reasons. These newborns have universally poor prognoses, no detectable state of consciousness or pain, and yet initially have viable healthy hearts, livers and kidneys. The only biological problem in using the anencephalic cadaver as an organ donor lies in the way these infants die. As mentioned above, the infant experiences progressive lapses in respiration leading eventually to cardiorespiratory arrest. However, these lapses also result in oxygen-starved organs that are so severely damaged they are no longer suitable for transplantation.(110) The literature reveals 80 infants with anencephaly which have been involved in transplantation protocols at 25 institutions. The most important of these studies authored by Iitaka in 1978, Holzgreve in 1987, and Peabody, the Loma Linda trial, in 1989.[d]

There have been four general approaches used to obtain organs from anencephalic infants. In the first approach, the infant is immediately

placed on maximal life support systems at birth. The organs are removed as soon as technically possible without regard to the presence or absence of brainstem findings (in other words, whether or not brain death has occurred). Holzgreve used this approach to remove kidneys from three infants with anencephaly and successfully transplanted the kidneys within one hour of birth into four recipients. All four recipients have functioning kidneys three years after transplant.(92)

The second approach is to place the infant immediately on maximal life support systems at birth and observe until all brain stem functions cease. Of the eight infants that have been monitored in this fashion, only one met brain death criteria within one week but the infant's organs were neither removed nor transplanted because of problems locating a suitable recipient. The other seven were removed from life support equipment at one week and allowed to die.

The third approach is to give the infant standard minimal care until substantial hypotension, hypoxia or bradycardia develops separately or in combination. At that point, the child is placed on maximal life support systems and observed to determine whether all brainstem functions have been lost. Of the nine infants monitored in this fashion, two lost all brain stem functions and one's organs went on to transplantation. The other seven were removed from life support equipment at one week and allowed to die.

The fourth approach is to give the infant standard minimal care until the development of cardiac arrest. At this point, the infant is resuscitated, placed on maximal life support systems and observed to determine whether all brain stem functions have been lost. Three infants have been monitored in this approach. Two met brain death criteria.

The success rates for transplantation with each of these approaches described above is; 100% for the first approach - resuscitate and transplant; 0% for the second approach - resuscitate, wait for brain death, and transplant; 11% for the third approach - wait until failing, resuscitate, wait for brain death, and transplant; and 0% for the fourth approach, wait until cardiac arrest, resuscitate, wait for brain death, and transplant.

The conclusion drawn from these figures is that transplantation is successful only when brain death criteria are ignored or, at best, current standards for resuscitation are ignored. The only course of action open to transplant surgeons is to remove the necessary organs from the anencephalic sometime during the infant's brief life span, preferably as close to birth as possible. However, if the heart is removed from an anencephalic infant, the immediate termination of that infant's heartbeat results; if the kidneys and liver are removed, eventual cardiorespiratory collapse results secondary to liver or renal "failure." These procedures are akin to battery and murder and are likewise against the law. (In fact, the physician who performs such procedure exposes himself or herself to homicide charges.) Likewise those parents who have rejected the option to undergo a therapeutic abortion, choosing instead to carry the fetus to term, and upon delivery wish to donate their child's organs to other imperiled newborns in order to create some positive meaning from an otherwise tragic situation are forbidden to do so by law. Physicians, lawmakers and philosophers have begun working individually and collaboratively to come up with a solution.

For those who seek to use anencephalic infants as organ donors, the solution involves circumventing the current brain death criteria encompassed in the Uniform Determination of Death Act (UDDA) and the

Uniform Anatomic Gift Act (UAGA). The UDDA and UAGA were written in response to modern medical technology's need for clarification of the definition of death and to facilitate the process of organ transplantation. The UDDA defines death as 1) the irreversible cessation of circulatory and respiratory function or 2) the irreversible loss of all functions of the entire brain including the brain stem. The UAGA clearly states that anatomic gifts can only be made after the donor has been declared dead. The current use of anencephalic infants as outlined above in Approach 1 is in direct violation of the UAGA because anencephalic infants do not meet the criteria of death established by the UDDA since live born anencephalic infants invariably have some level of brainstem function, tenuous as it may be.

The protagonists who support the use of anencephalic donors believe that either the UDDA should be amended to include anencephalic infants as "dead"[e] or that the UAGA should be amended to allow parents to donate their anencephalic infant's organs without the requisite pronouncement of death.[f] There are three lines of reasoning these investigators have used to justify their arguments. The first is that anencephalics <u>are</u> brain dead already; the second, that anencephalics are special exceptions to the criteria that define death; and the third, that the definition of whole brain death is antiquated and should be revised.

The first line of reasoning, which is used exclusively by Holzgreve, holds that anencephalic infants are brain absent and therefore brain dead.(92) Says Holzgreve, "the anencephalic fetus, because of the absence of brain development, has never been alive despite the presence of a heartbeat." This concept is accepted in the courts of the Federal Republic of Germany and allows the termination of pregnancy at anytime during

gestation. The basis for this rationalization comes from a paper by Chervenak, other American OB-GYNs, and medical ethicists that included anencephaly as one of the morally justifiable indications for third trimester abortion. They rationalized thus because of the highly reliable diagnostic procedures available for prenatal diagnosis and because third trimester abortion would allow the mother to conceive again earlier.(45) Holzgreve believes that the third trimester fetus is not any different than the newborn anencephalic and there should not be any special considerations at birth. The principal problem with using this argument in the United States, of course, is that of law; birth endows the born with the rights of American citizenship, the so-called inalienable rights of life, liberty and pursuit of happiness, and thus are protected under the Fourteenth amendment from being killed.[g]

The notion of according newborns with full status of persons is, however, a relatively recent phenomenon that was developed in the late Nineteenth Century. Historically, many societies have expressed their prejudices against children in the widespread practice of infanticide - in some societies sanctioned by the state, in others formally prohibited but tacitly accepted. The ancient Greeks feared that defective persons would transmit undesirable traits onto the next generation and therefore actively promoted killing such children at birth. Grecian law allowed infants to be exposed to the elements until the time they would be admitted to the family through a special ceremony, the amphidromia. By the Middle Ages, infanticide had acquired the stamp of official condemnation in England, yet few cases of infanticide were tried in the king's courts.[h] Instead, these instances were dealt with by ecclesiastical authorities who regarded infanticide as a venial sin that could be handled under the traditional

requirements of penance: one year on bread and water and two more years without wine or meat for intentionally smothering an infant.(202, at pp. 12-13)

The second line of reasoning which would allow using anencephalic infants as organ donors involves defining anencephalic infants as exceptions to the criteria for the diagnosis of death. Some investigators believe that anencephalic infants are appropriate exceptions because an important feature of anencephaly is the relative certainty of diagnosis and universally grim prognosis. This certainty should allow anencephalic infants to be labeled as "brain absent" persons. The quality of brain absence would exclude them from the diagnosis of brain death (which is difficult enough in the newborn population[i]) and the UDDA could be rewritten to diagnose death as 1) the irreversible cessation of circulatory and respiratory function, 2) the irreversible loss of all functions of the entire brain including the brain stem, or 3) brain absence. (The wording "including the brain stem" was important in order to exclude patients with PVS and other similar syndromes from being defined as dead.) The UAGA could be rewritten to allow donation from dead or brain absent donors. Harrison argues that the whole brain definitions were drafted to serve the comatose patient whose injured brain might not recover function.(87, at p. 1385) However, failure of the brain to develop is clearly different from injury. The terms of brain death cannot apply to anencephalic infants because they lack the physical structure which is necessary for recovery.

The rationalization of using anencephalic infants because they are brain absent persons has come under tremendous attack, the most strident being from those who are not convinced of the precision of the diagnosis and prognosis. Although most studies show that the diagnosis and

prognosis of anencephalic infants are precise and grim, the previously mentioned survey that was undertaken by the Task Force on Anencephaly disproves that anencephaly can be universally diagnosed precisely and points to the conclusion that the criteria for diagnosis listed above are insufficiently specific and/or leave too much room for physician error. Ethicists insist that we cannot allow misdiagnosis to inadvertently provide inappropriate donors. Medearis says that "the evidence indicates that anencephaly is a heterogeneous condition anatomically and functionally, that the diagnosis of anencephaly cannot be made with sufficient accuracy and that the condition cannot be distinguished well enough from other severe intracranial disorders to justify changing the law."(124, at p. 393)

Other critics argue that misdiagnosis by itself would not appear to be a great enough risk to preclude the use of anencephalic infants but their observed relationship to infants with other congenital neurological defects is a major concern. Hydranencephalic and some microcephalic infants are conceptually indistinguishable from anencephalic babies in that they all suffer from lethal neurologic conditions that preclude normal brain development. Because of the existence of these other diagnostic categories, critics like Alan Shewmon feel that decision-makers will be pressured to expand the "definition" to sweep in other similarly situated "dead neonates."(176, at p. 1778) In somewhat different terms, Shewmon's real fear here is the Pandora's box supposedly inherent in defining death. Once the camel's nose is under the tent, there is no way to keep it from getting the rest of its body inside. This is the so-called "slippery slope" argument; once the first step is allowed, there is no way to prevent sliding down to the horrors at the bottom (i.e., harvesting the organs of anyone 'we' consider undesirable, unnecessary, unworthy). The only effective way to

stop what this argument contends is inevitable is to ensure that not even the first step be permitted.j

Another objection to the "brain absent" theory is that brain absent individuals are still persons, and as such, are entitled to be full members of the moral community with rights and worthy of respect. The question then becomes whether prolonging the infant's life by mechanical ventilation and then abruptly terminating it by harvesting vital organs is compatible with the minimum respect due all persons.(14, at p. 2284) Kantian philosophy, which is the source of many contemporary moral theories and is based on the concept of personhood, is embodied in the Mere Means Principle which states: "Act in such a way that you always treat humanity, whether in your own person or in the person of any other, never simply as a means, but always at the same time as an end."(99, at p. 96) This principle forbids the use of a person merely as a means to benefit another and much of our legal and moral tradition upholds this principle. Thus, it is understandable that there is considerable reluctance to intrude on an individual anencephalic infant's bodily integrity in order to further the interests of another albeit dying child. Critics maintain that to assign the label of "brain absent persons" to anencephalics implies that they must be accorded the rights of persons and to consider the propriety of removing organs from an independently breathing infant in order to benefit others raises the Orwellian possibility that not all offspring of human parents qualify as "persons" accorded individual rights.

A compelling objection to the brain absent theory is that anencephalic infants, despite their poor prognosis, are dying and not, in fact, dead. Dying persons are entitled to full measure of respect and dignity. Capron emphasizes that any policy that would allow the killing of a

living patient for their organs (especially the most vulnerable) is too odious for consideration. Because they do not meet the current definition of death, they are then, by definition, living persons.(42, at p. 6)

> "Adding anencephalics to the category of dead persons would be a radical change, both in the social and medical understanding of what it means to be dead and in the social practices surrounding death. Anencephalic infants may be dying, but they are still alive and breathing. Calling them "dead" will not change physiologic reality or otherwise cause them to resemble those (cold and nonrespirating) bodies that are considered appropriate for post-mortem examinations and burial."(42, at p. 6)

Gilbert Meilander's critique implicitly builds upon Capron's concerns by pointing out that if a dying person is accorded rights then the use of anencephalics as donors violates those rights:

> "To intervene in this baby's living and dying in ways we normally reject (because we think it an indignity to a dying subject) would be to do so for reasons entirely unrelated to the case of Baby Z. What we *accomplish* thereby would be good; what we *do* would not."(125, at p. 23)

Another way the investigators have justified making anencephalic infants legitimate donors which gets around the brain death criteria and the Kantian objection is to regard them as "nonpersons" i.e. biologically human entities that nevertheless lack the prerequisites of "personal" life and thus lack full moral status. Dr. Leonard Bailey, a transplant surgeon at Loma Linda termed the anencephalic infant a "nonperson human derivative."(75) Those writing on the subject of personhood have attempted to answer the

question "what properties must a being possess in order for it to have a right to life?" Typically, the response is given in the form of a list of characteristics which represent a rough sketch of the necessary, and perhaps sufficient, conditions for being a person. Rationality and self-consciousness are the common denominators among the various inventories.[k] Philosophers and ethicists have relied on this premise to draw a distinction between persons and human beings. Persons can be viewed as a subset of humanity and only those humans who possess or have the potential to possess certain attributes attain the status of persons and as such have rights and autonomy which must be respected. Thus, only beings of, or having the potential for, sapient life have the rights and privileges of personhood. If anencephalic newborns are nonpersons, one could perhaps justify using them as mere means for the benefit of actual "persons."

The idea that a product of human conception is biologically incapable of achieving "humanness" seems radical until we consider the many products of conception lost by early miscarriage and stillbirth because of gross abnormalities, or those fetuses who are therapeutically aborted when they are "nonviable." As stated above, anencephaly is the one condition upon which there is agreement that even very late third trimester abortions are morally permissible.(45) Proponents of the "nonperson" rationalization do not believe that the considerations which uniquely permit late abortion for anencephaly should suddenly cease to apply at the time of live birth. They argue that the contrast between the refusal to perform very late abortions on other fetuses and the practice regarding anencephalics indicates that physicians and a society regard them as nonpersons. They also believe that the reluctance to interfere with these infants immediately following birth

is explainable only as a wish to conform with legal prohibitions. They propose to reverse the causal relationship, so that the law in this area reflects social consensus and medical reality.

Chervenak's paper aside, critics argue that the proposals to harvest vital organs from anencephalics are premised on an analysis identical to that used to justify abortion. The moral stricture against harvesting organs applies only to persons. These infants can no more satisfy even minimal criteria of personhood than can fetuses. Moreover, even though many would agree that the potential for development inherent in fetuses and infants merits protection, that argument disappears in the case of anencephalics, for such entities will never qualify as persons in the sense put forth by proponents of personhood theory. These critics believe that the conceptual relationship between the anencephalic newborn and a nonviable fetus "ex utero" is a close one.(72, at p. 946) Both are capable of independently sustaining respiration, albeit for a limited time and consequently, both qualify under the current statutory framework as living persons. However, in England, the Peel Commission, appointed to study the ethical and legal implications of fetal research in 1972, reached a conclusion that treated nonviable fetuses in substantially the same manner as dead fetuses.[1] The Commission's recommendations permit experimentation that would terminate vital functions of the nonviable fetus. In the United States, however, federal regulations toward research involving the fetus "ex utero" conform to the predominating live birth standard and prohibit any experimentation on a nonviable fetus that would terminate the heartbeat or respiration.(112, at p. 407) It is the view of one author, however, that it was a growing appreciation of the highly developed neurological structure possessed by nonviable fetuses and the

accompanying capacity to experience pain that was the basis of the difference between the English and American regulations.(72, at p. 948) The anencephalic is distinct from nonviable fetuses in its lack of such neurological structures and consequently would qualify differently under U.S. regulations if the ability to experience pain were the issue. Therefore, there is precedent for declining to recognize the significance of borderline biological life in both the Peel Report and the U.S. regulations when applied to anencephalics.

The Roman Catholic Church, although hardly a supporter of the abortion issue, considers anencephalics "nonpersons" because they lack a "human soul." According to Roman Catholic tradition, the human soul has the power or the potential power of reason and of thinking in terms of concepts and of the inner nature of things. Since the anencephalic lacks the requisite brain structures for these processes, he or she is therefore, in the eyes of the Catholic church, without a soul and accordingly is a suitable organ donor.

Objections to the nonperson rationalization are again myriad. If the theory is carried to its logical conclusion, other infants with conditions such as holoprosencephaly, hydranencephaly and certain trisomies, as well as adults in persistent vegetative states, should be considered as potential organ donors - again the slippery slope argument. Capron objects that this "nonperson" concept would be a radical redefinition of the accepted criterion for being a person, "namely live birth of the product of human conception."(43, at p. 8)

History, however, provides us with many examples whereby some products of human conception were not deemed "persons". Beginning in the Middle Ages, the common law recognized a class of nonhuman beings,

"monsters" who were humanly conceived but were not considered human beings. Human beings were considered "reasonable creatures in being," a term denoting the capacity (presently or prospectively) to reason. This principle was carried forward in the first nationwide German penal code, the so-called Carolina , which was in force in a substantial part of Europe from its enactment in 1532 until 1871. In contrast to Roman Law, which punished the killing of slaves only as the destruction of property, the Carolina Code drew no distinctions between human beings as far as homicide was concerned, with the notable exception of abortion and "monster" killing. Such creatures were presumed to lack souls, and were therefore not considered persons to whom the statutes governing the protection of human life applied. Two rationales have been put forth in explanation of the historic denial of personhood to newborns, particularly defective ones. The first substantially undercuts the authority of these long-standing doctrines. It is the belief in "hybridity," the notion that these anomalous infants must have been the product of an animal paternity. By definition, then, they could be denied status as human beings since they lacked full human parentage. The second is exemplified by English physician Charles Mercier's writings of 1911:

> "In comparison with other cases of murder, a minimum of harm is done by it. . . The victim's mind is not sufficiently developed to enable it to suffer from the contemplation of approaching suffering or death. It is incapable of feeling fear or terror. Nor is its consciousness sufficiently developed to enable it to suffer pain in appreciable degree. Its loss leaves no gap in any family circle, deprives no children of their breadwinner or their mother, no human being of a friend, helper, or companion. The crime diffuses no sense of insecurity. No one feels a whit less safe

because the crime has been committed."(72 at p. 950)

But, after all, what difference does it make if the anencephalic infant's life is shortened by a few hours? There is an intuitive appeal to this question that is based on utilitarian calculations (and perhaps euthanasia interests). First, lacking the necessary structure, these infants are oblivious to what little life they have and so active termination could do them no conceivable harm. Second, it benefits the parents by shortening their grieving process and allowing them to salvage some good from a bad situation. And third, it saves the life of a recipient. Surely, using the anencephalic as organ donor maximizes health within society, but does maximal happiness accompany this procurement of health? Is the cost of that happiness too great?

Thus, we come to the third line of reasoning that proponents for allowing anencephalic infants to be used as organ donors have argued which is that our current definition of death is antiquated and needs to be revised. These proponents believe that death of the person should be equated with irreversible loss of cortical function since the continued identity of the person depends on the presence of cortical function. Based on criteria that require some level of cognitive function, an argument can be made that brainstem activity alone has no intrinsic moral significance. Indeed, some proponents of a higher brain definition of death believe that a concept of death which focuses on respiration and circulation or on integrating capacity is biologically reductionistic.(192, at p. 312) The higher brain concept represents a philosophical view of death fundamentally different from that embodied in either the whole brain or cardiopulmonary formulations. The former equates personhood with consciousness and the

cognitive functions, arguing that since these abilities set humanity apart from other species, their loss can be equated with death.[m] Other proponents suggest that the whole brain death formulations are, in fact, morally wrong. As Veith writes,

> "If there were no offense, no moral or social costs in treating dead persons as if they were alive, then the safer course would be to continue to do so. Quite clearly, however, this is not the case. In addition to reflecting an inadequate understanding of the nature of man, it is an affront to the individual person or that person's memory to treat a human being who has irreversibly lost all [higher] brain function as if he were alive. It confuses the person with his corpse and is morally wrong."(194, at p. 420)

The critics of course have a response and this one is cited in the influential report of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research. They afforded the brainstem with moral significance because 1) it serves as the principal source of integration for vital physiologic processes and 2) perhaps more important from a public policy standpoint, it produces sufficient activity in individuals to support the appearance of being alive by our basic intuitive criteria. These patients breathe spontaneously, may have sleep-wake cycles with eye opening and movement and they may yawn and have reflex motor activity. For the family member at the bedside, such a patient is not dead. The commission believed that attempts to define such patients as dead would be met with confusion and suspicion that the medical community was turning to the horror movie "Coma" for its directives.[n]

In summary, pioneering triumphs in transplantation have created a

profound dilemma. Should physicians manipulate the definitions of life and death to meet this growing demand for donor tissue? Should laws defining death be rewritten to allow the "harvesting" of anencephalic donors? Should the definition death be swayed by transplantation needs? Before we begin to grapple with these questions, a review of how death has been interpreted, regarded and diagnosed throughout history is required.

III. THE EVOLUTION OF DEATH'S DEFINITION AND DIAGNOSIS

The preceding review of the anencephalic debate reveals that despite much scholarly discussion and deliberation there still exists considerable public confusion about the definition of death. It appears that there is no consensus on whether or not the anencephalic infant is by definition dead or alive. Surely this confusion stems from the fear that death is not really as certain as taxes, that its threshold is more shadowy than we would care to believe. This is certainly not a new phenomenon. Since the beginning of time, the mystery of death has constituted a fearful problem and in order to cope with it man has developed and continues to develop ideology and ritual to handle its emotional challenge. In order to assess the significance of the concept of brain death, a review of how death has been interpreted, regarded, and diagnosed throughout history, will be undertaken.

To prehistoric people, as to people from primitive cultures, death appeared to be a form of deep sleep.(63, at p. 1) They considered death to be a world much like somnolence that "differed from this one only its diminished intensity".(12, at p. 23) Ancient as well as modern literature abound with references that equate death with slumber. The Homeric Hades speak of the dead as a "dim multitude," "unfeeling phantoms of exhausted humans," that "are sleeping the sleep of death." Virgil's underworld is a "kingdom of shadows," the "abode of sleep" and a "sleep inducing night." Oliver and Roland say good-bye as if each were about to fall into a long sleep of indefinite duration.(12, at p. 23) Indeed, the belief that the dead are asleep is as constant as it is ancient. The Greeks compared Death, which took the shape of a beautiful young man resembling Eros, and compared him

to his brother Sleep. They called their burial grounds "cemeteries" which means "sleeping rooms."(107, at p. 153) The medieval and Gallican liturgies mention the *nomina pausantium* (the names of those who sleep) and invite the faithful to pray "*pro spiritibus pausantium*" (for the souls of those who sleep). The Extreme Unction reserved for the clergy in the Middle Ages was called the *dormientum exitum* (the sacrament of those who sleep), and today in many churches the prayers for the dead are said for the *repose* of their souls. (12, at p. 24)

The diagnosis of sleep-death was made when attempts to wake the dead failed. Shouting, loud noises, and attempts to inflict pain by slapping or whipping the "sleeping" with wet clothes or stinging nettles constituted the first tests for death and established the notion that death, unlike sleep, was a permanent and irreversible condition.(63,184)

Gradually as man became more aware of his finiteness and this awareness became more frightening, man began to seek abstract, elaborate and often powerful explanations which would allow him to cope with his biological eventuality. One of the most pervasive themes often set within religious or philosophical systems of belief is the concept of immortality. Early man began to regard death as a transition from one life to another form of life. Indeed, the Dead Sea Scrolls of the First Century B.C. focus no attention on the biological aspect of death, but rather focus upon the possibility of transition from one, this-worldly, mode of existence to another - from what is metaphorically described as "death " to "life."(18, at p. 245)

As the emphasis on the concept of death as a transition process grew so did the emphasis on burial as a rite of passage, with the mortuary rituals and funeral customs reflecting the culture from which they were derived but

all sharing the theme that death merely separated an active life from an active afterlife. The paleolithic people prepared and inhumed their dead with food and other equipment, implying the belief that the dead would have needs to meet in their next life. In ancient Egypt, the body was put through an elaborate burial ceremony which included mummification to preserve the corpse from disintegration. Tombs were built within great pyramids and were filled with the best furniture, jewelry, tools and pictures of the deceased and his family. In Peru and China, tombs have been found with substances alleged to have life-prolonging properties such as jade placed in the orifices of the corpse.(32, at pp. 11-12) The Greeks and Romans believed that the dead must cross a barrier dividing the world of the living from that of the dead, the river Styx. Charon, the boatman, carried the corpse in whose mouth a coin was placed to pay for the trip. These early customs would suggest that man refused to accept death as the definitive end of life and insisted that something of the individual continued to survive the dying experience. There also may have been some subtle reassurance in the belief that luxuries, medicines, regulations and fees applied in death as well as in everyday life.(102, at p. 46; 32, at p. 11)

Insofar as the dead were recognized as possessing certain qualities of the living, provisions were made for communication with the dead in some cultures. The earliest Romans buried their deceased next to the hearth in their houses, and when the laws prohibited this custom, they interred the body just outside the city walls. They believed that the dead continued to live in intimacy with their family and from this concept sprang up a "cult of the dead." It was also the custom to gather periodically near the dead body to tighten the bonds that tied him to the living. Tombs were constructed with seats in a semicircle to accommodate the visitors.(32, at p. 13)

Western philosophical thought had its beginnings in the midst of these beliefs. However, the notion of an actual physical immortality, an embodied continuation of life after death, gave way to the conception of an immortality in less physical terms, a spiritual immortality with an at least partially disembodied "spirit" or "soul." The preSocratics' observations of the natural order, and of human life and death as part of it, focused on the harmony between man and nature, continuity and change. Parmenides stressed the fundamentally unchanging order of things, while Heraclitus emphasized the constant change in everything except the Logos. Empedocles originated the doctrine of the four elements - earth, air, fire, and water. Pythagoras alone presented a comprehensive doctrine with regard to death which held that after death souls migrated from one animate being to another.(83, at p. 236)

In the classic writings of Socrates (468-399 B.C.), Plato (472?-437? B.C.) and Aristotle (384-322 B.C.), the philosophical fountainheads for Western ethical thought, we see the scant beginnings of significant thinking about death. Plato believed that the "Demiurge" created souls of all the planets and all individual souls. These individual souls, he taught, are eternal, having existed before they came into bodies. In this preexistence "each soul saw all pure ideas in a realm of perfect ideas. But coming into the body is like entering a prison. The body clouds the soul and it forgets all it has seen."(73, at p. 157) Thus, the goal of the soul, Plato held, is to free itself from the body in order that it may see truth clearly. The drama of Socrates' trial and execution is central to Plato's discussion of death. In the Phaedo, Socrates proclaims as he faces immediate death,

"I desire to prove to you that the real philosopher has

> reason to be of good cheer when he is about to die, and that after death he may hope to obtain the greatest good in the other world...Is death not the separation of soul and body? And to be dead is the completion of this: when the soul exists in herself, and is released from the body and the body is released from the soul, what is this but death?"(146, at p. 447)

Aristotle taught that the soul is to be found wherever there is life and, since everywhere in nature there are signs of life, the soul must be throughout nature. If we examine nature we will find, according to Aristotle, a series of souls beginning with the lowest or plant souls and moving upward to the highest or human souls. The human soul is higher because it has the power of thinking in terms of concepts, is able to think about the inner nature of things, that is, the human soul has the power of reason.[o] Aristotle divided reason into what he called passive reason and creative reason. This creative reason is a spark of the divinity, a part of God, which comes in to the soul from without and is not influenced by the baser side of the soul (passive reason). This part of the soul survives death and since it is actually part of God, simply returns to God. Thus personal immortality is impossible in Aristotelian terms.(73, at pp. 158-9)

The concept of a personal extinction through death was unknown in the Western world until the Third Century B.C., during the Hellenistic age, when it appeared in the writings of the Greek philosopher Epicurus (342?-270 B.C.). The disastrous conclusion of the Peloponnesian War precipitated the decline and death of the Greek city states. The Romans, powerful, expansive and efficient, achieved great successes on the military front but these conquests produced diminishing satisfaction as well as a widening gap between those with great wealth and power and those with

poverty. Social and political problems abounded and the ancient gods offered no comfort. Gilbert Murray refers to this age as marked by a "failure of nerve."(83, at p. 238) Into this melange of Greek culture and Roman laws and organization, the philosophical schools of Epicureanism and Stoicism emerged. These philosophies were not an extension of Socratic inquiry but rather prescriptions for a way of life and, not surprisingly, for a way to face death. In contrast to the Socratic teachings from which they claimed to have been derived, the Hellenistic schools emphasize the negative - "deliverance from evil, escape from an alien world, salvation from sin."(83, at p. 239)

Epicurus' remedies were designed to liberate men from fear of the gods, to assure them that death was a relief to be welcomed, and that a relatively good life could be attained in simplicity and seclusion. The soul, being material, dissipated after death and was not part of an immortal continuum. Death is the end for both body and soul. As Lucretius, one of the later Epicureans, wrote, "A fool will not make more out of the hereafter than he has made of this life."(73, at p.159)

Stoicism, though often contrasted with Epicureanism, shared its essential purpose: to provide a way of life designed to make existence bearable. For the Stoics this way of life espoused an ethic of rigorous duty and civic virtue. Death, however, was seen as an escape from an otherwise unavoidable evil. "The door was always open - and [the Stoics] held to the conviction (Seneca put it into practice) that suicide was a way out."(83, at pp. 238-9) The Stoics held that man is both soul and body, and the soul is a spark from the divine fire controlled by a ruling part located in the heart. The soul of man was considered the source of perception, judgment, feeling and willing, and allowed man to deliberate and make choices before he acted.

Various Stoics held different ideas of immortality. Some taught that only the good and wise souls continued to exist after death of the body, while all other souls perished with the body. Other Stoics held that all souls, regardless of their nature, lived until the end of the world.

Along with Epicureanism and Stoicism, other cures were sought for the so-called failure of nerve. Men turned to new and exotic faiths to supplement or replace their traditional religion such as Persian Mithraism, Menicheanism and the promise of salvation through faith in Jesus of Nazareth. The Old Testament as well as the New now entered the mainstream of Western culture, and the Hebrew-Christian ethic came to dominate Western thinking, including thought about death.

There is relatively little concern with death in the Hebrew scriptures. The prevailing mood of Hebraism was expressed in the passage in Ecclesiastes 3:2 "there is a time to be born and a time to die." In the Old Testament, attention is focused almost entirely upon this world and its activities. Between birth and death there should be a full life and what happened after death was not a matter of religious importance. Mortality is calmly accepted as part of the definition of being human. Real immortality pertains to the race, rather than to individuals, and to vicarious immortality through one's descendants.(18, at p. 244)

Christianity, although rooted in the Old Testament, reversed Hebrew emphases. Jesus of Nazareth and the Christian promise of Divine love supplied a doctrine of salvation from evil. The natural world (as interpreted by Christian theologians, Augustine (354-430 A.D.) and Aquinas (1225 - 1274 A.D.)) was viewed primarily as the scene of human salvation and human kind as essentially sinful, doomed to die and to suffer eternal damnation unless rescued by supernatural grace. The earliest spokesman of

the Christian church, Paul (50 A.D.?), concentrates upon biological death as a consequence of sin (Romans 6:23), unleashed by the disobedience of Adam and Eve (Romans 5:19). Death then is the enemy, but since Jesus, perceived as having risen from the dead, has conquered this enemy through resurrection, death becomes a historical problem not a metaphysical one.(18, at p. 245) The power of death has been negated, although it temporarily continues to manifest itself biologically. That will cease, at the beginning of the "new age," when all followers of Jesus, living or deceased, will be granted "immortality."(1 Corinthians 15:53-54)

These basic beliefs, espoused by the Hebrew-Christian tradition, which held that death is a biological process but that the "spirit" or "soul" maintained a spiritual immortality remained the primary popular orientation toward death through the Middle Ages. However, in the Middle Ages, there began a preoccupation with the horror and degradation of death. In the Crusades and the Bubonic Plague, medieval man encountered exceptionally horrible, violent and disfiguring death.(102, at p. 18) Tombstone markers during this time reflected this theme; below the effigies of the deceased were placed other effigies of their naked, decaying corpses. These were considered the memento mori tombs of the period.(32, at p. 13) The doctrinal belief of purgatory (a state of temporary punishment and suffering in which the souls of those who have died in grace must expiate their sins) also gained unprecedented importance during the Middle Ages. Christian funerary rituals reflected this theme; "the entire ceremony was marked by black clothes, unbleached wax candles, solemn tolling of the bells. The coffin was carried to the church, trailed by a sad cortege and accompanied by sounds of mourning and the smells of incense."(32, at p. 12) Other customs provided for continued expiation to God in hopes of alleviating the

sufferings of the departed souls. Wealthy Christians endowed monasteries and built chapels where masses could be said regularly for the repose of the soul of the dead and those of his relatives.p(32, at p. 13) The terror of death is perhaps best seen in the paintings of this time, which picture death as a devil, killer, or revengeful destroyer, using a sword, scythe, spade, arrow, rope or net during its relentless attempts to trap man.(107, at p. 154)

Another product of the horror and degradation theme of death in the late Middle Ages was the Ars Moriendi. The Ars Moriendi were Christian guidebooks for the dying and first appeared early in the Fifteenth Century. Their message was that there was an art to dying as well as to living and that the two, in fact, were intimately related. One should live each day as though it might be the last. This should not lead to self-indulgent or immoderate behavior but rather that the sure prospect of death should inspire the highest plateau of moral rectitude.(102, at p. 17)

> "For as much as the passage of death, of the wretchedness of the exile of this world, for uncunning [ignorance] of dying - not only to lewd man [laymen] but also to religious and devout persons - seemeth wonderfully hard and perilous, and also right fearful and horrible; therefore in this present matter and treatise, that is of the Craft of Dying, is drawn and contained a short manner of exhortation, for teaching and comforting them that be in the point of death." (102, at p. 18)

These guides to Christian dying, in addition to providing a model of proper behavior to which dying people could aspire, served as practical handbooks for those who would come into the presence of the dying person. They also provided an assurance that one might pass safely through the

dread crisis and functioned as an aid to making the transition from the things of this life to the hereafter.(102, at p. 18) It is interesting to note that both the fifth section of the longer form of the Ars Moriendi and Gerson's De Arte Moriendi advise those who attend the dying man not to give him false hopes of regaining the health of his body. This is a commentary not only on the state of medicine in the later Middle Ages and on contemporary attitudes toward it but also on the Christian understanding of the death of the body. Since death was a beginning not an ending, there was no reason to take any measures to postpone it.[9](47, at p. 254)

The Ars Moriendi tradition eventually receded as the high spirited Renaissance, the vigorous Industrial Revolution, and the rise of science transformed the conditions of everyday life. In 1543 Vesalius published his book, The Structure of the Human Body, which dismissed much of Galen's descriptions from the second century A.D. and thereby renewed and modernized the study of anatomy. William Harvey published in 1628 a treatise On the Movement of the Heart and Blood where he set forth the doctrine, confirmed by evidence, of the continual circulation of the blood through arteries and veins. By the middle of the seventeenth century, coordinate geometry had been mapped out by Descartes, the theory of probabilities developed by Pascal, and calculus invented by Newton.

The explosion in physiologic, chemical, and mathematical discovery influenced not only the "scientists" but also their philosopher peers. From the Renaissance onward, Western thought became predominantly secular and scientific. Francis Bacon (1561-1626), Thomas Hobbes (1588-1679) and Rene Descartes (1596 - 1650) reflected the influence of science and secularism in their thinking. Bacon taught that the human soul was actually two souls, one divine or rational and the other irrational. The divine soul

was, he held, a matter for religion to handle. The irrational soul, however, was open to study and understanding by man using the methods of science. By these methods Bacon believed that we would find this soul to be material but invisible, residing in the head and running along the nerves to all parts of the body. The soul was the seat of reason, imagination, understanding, memory, appetite and will.(73, at p. 163)

Hobbes broke completely with the past. He held that the entire universe was material and that in such a universe there could be nothing corresponding to the human soul as described by earlier philosophers. His materialistic position left no room for an immaterial soul that could survive the disintegration of the body.

Descartes felt that the logical result of science was a mechanical and materialistic universe, but he was equally certain that this was not the complete explanation of the universe. He wrote "the sciences have a definitely practical aim, the harnessing of nature to the purposes of man. The will o' the wisp o' his life was the conquest of death not only for the soul but also for the body."(46, at p. 111) Both Bacon's and Descartes' writings were concerned with removing the fear of death. Bacon believed that if one learned how to live properly and calmly, one would know how die in the same manner. Descartes, however, believed in a sharp dichotomy between body (res extensa) and mind (res cogitans), the so called Cartesian dualism, which allowed Descartes to ascribe to the more traditional view of death, which provided the assurance of the survival of the soul.(83, at p. 240) Descartes held that although the soul is united to all the portions of the body 'there is yet. . . a certain part in which it exercises its functions more particularly than in all the others."(55, at p. 345) Of interest to our future discussion, Descartes was convinced that this "part" was in the brain,

"not the whole of the brain, but merely the most inward of its parts, to wit, a certain very small gland which is situated in the middle of its substance," that is, the pineal body.(192, at p.309)

The position of John Locke (1632-1704) resembles very much that of Descartes insofar as the universe being composed of two substances, bodies and souls, and that souls are spiritual substances endowed with the power of perceiving, thinking and willing. Locke, however, shared a different view of immortality. For Locke, that the soul is immortal, lives after death of the body, is a matter of faith and not a concept which requires scientific proof or objective verification. Locke held that that true or certain knowledge is derived from experience and since we could have no first hand experience of the soul, it must, by definition, be outside of our certain knowledge.

In the Eighteenth Century, David Hume (1711-1776) attacked the entire doctrine of immortality, and the French philosophers of the Enlightenment (D'Holbach 1723-1789; Cordorcet 1743-1794; Diderot 1713-1784) held it to be a "priestly lie." Hume, carrying the Lockian position to its logical conclusion, held that we can have no certain knowledge either of material or spiritual substance. He was agnostic, without definite conviction, regarding the soul and believed that "no investigation would reveal an immaterial, indivisible, imperishable soul-substance."(73, at p. 166) The French philosophers were more adamant and held that "Fear of death is the only true enemy that has to be conquered, and that there is no afterlife makes us free from the power of the priests."(46, at p. 135)

Immanuel Kant (1724-1804) held that the understanding cannot know anything but that which is experienced. However, reason can go beyond this

and conceive of a world of which we can have no actual experience. It can transcend, rise above experience and thus give us transcendent principles. Reason gives man an idea of soul as the summation of all mental processes. Although we can never experience the soul, according to Kant, the idea of soul has value and therefore it is legitimate for us to think of it. Although we cannot prove the existence of an immortal soul, we may act as though one existed since there is real value in so doing. Furthermore, the idea of the soul has ethical value. It is a result of the moral law and serves as a basis for moral life.(73, at pp. 167-8)

For Georg W. F. Hegel (1770-1831), Kant's moral argument had other implications. Immortality he considered to be a quality of the living spirit, not an event in the future. And death, Hegel believed, had "the peculiar effect of uniting the individual with universal matter. The living individual is a particular person; once dead, however, he becomes, through bodily corruption, indistinguishable from abstract being."(90, at p. 192)

Soren Kierkegard (1813-1855) and the existentialists attacked Hegel and traditional philosophy in general for concentrating on the "essence" of things as against the "existence" of the specific individual. They emphasized the value of the immediate experience as opposed to metaphysical abstractions. Like the Romanticist philosophers in their emphasis on the values of the individual, the existentialists stressed the significance of the crucial experiences of human lives, including the experience of death.(83, at p. 241)

The individualism of Romanticists and of Kierkegaardian existentialists contrasts with an outlook that developed during the Nineteenth Century and found its expression in Auguste Comte's (1798-1857) positivism. For Comte "society is composed of both the dead

and the living. . . For the dead have gone through the moment of change, and their monuments are the visible signs of permanence of their city."(13, at p. 73) The search for a soul and a belief in immortality, meanwhile, Comte considered characteristics of an earlier and more childish stage of human development. As man becomes more mature in his development, he recognizes that such beliefs are not exact, that they are mere wishes which cannot be proven or founded upon fact, and therefore must be abandoned.(73, at p. 171)

In summary, death throughout history has been an event approached by man with fear and anxiety. No doubt this fear stemmed from the earliest perception that death was absolute and irreversible. Some eras have been fraught with more fear than others with consequent differences in custom and ritual. Along with these customs and rituals man also developed different beliefs to cope with his fear of death and different sciences to attempt to understand the reality and nature of these fears. The theme of immortality is ancient and constant, with the immortal substance changing from an embodied form to a disembodied soul as man's understanding of his own makeup advanced. Probably more people in Western world history, and even more people alive today, have believed that death means the irreversible loss of the soul from the body than any other concept of death. Classical Greek thinkers, Christian and most secular Western thought, until recently, have held that "the soul was the animating principle of thought and action in man and was identified with mental, emotional and sometimes (but not always) with spiritual functions. It was nonmaterial, but nevertheless a metaphysical reality."(192, at p. 309) And loss of this soul meant the loss of animation and consequent death.

But what of the diagnosis of death when death means the moment

when the soul leaves the body. As Robert Veatch explains, there is no easy test to analyze whether the soul has left the body [see 192 pp. 21-55] and certainly no test that the early Greeks practiced. Concomitant with the evolution of interpretation of death, there were also centuries of observation of death. Generations of repeated trials of resuscitation and observation allowed man to discover the association between death (failure to revive) and loss of respiration and heartbeat. Once death was interpreted as a time when the soul left the body, the concepts of life and spirit were linked to breath and air. The Hebrew 'ruach' means "spirit" or "breath of life"; the Sanskrit 'atman' means "breath" or "soul"; in Swahili 'roho' means "soul" or "breath"; in Chinese 'ch'i' means "vapor," "breath," "primal aura," or "vital fluid."(78) Indeed in modern English, one way to say a person has died is to say that he or she has "expired," a word rooted in the same word from which the English language derives "spirit," "inspire" and "respiration." Not only did life begin and end with first and last breath, but immortality, the soul, the divine aspect of every human being, is also associated with breathing and breath. Earliest biblical sources recognized the ability to breathe independently as a prime index of life and of the installation of the soul. "And the Lord had fashioned man of dust of the earth and instilled in his nostrils the breath of life and man became a living creature." (Genesis 2:7) In medieval Christian art, the soul is sometimes depicted escaping out of the body with the last breath.

The Bible also makes reference to another indicator of life, the heartbeat transmitted by blood. Deuteronomy 12:23 declares that "the blood is the life;" Leviticus 17:14 that "the life of all flesh is the blood thereof." And we are commanded to love the Lord our God with all our hearts, souls, minds and strength. (Luke 10:27) Since the pulse was associated with life,

the absence of a pulse naturally was associated with death. Absence of heartbeat was detected either by palpation of pulses or by direct auscultation of heartsounds and was therefore a less accessible sign of death than was the absence of breathing which could be directly observed without having to touch the body in question.(139, at pp. 847-61.)

When modern man secularized his philosophical understanding of his nature, he had to find another more biological formulation of what it meant to be dead. In answer to the question, "What is it about human life that its loss is so essential, the individual who loses it ought to be called dead?," modern man began to give answers focusing on the heart and lungs. Instead of these signs being indicators of the presence or absence of the soul, they became indicators of life itself. Visual and tactile observations of respiration, pulse and heart beat were easily enough identified. These measures could be supplemented by refinements (holding a cold mirror in front of a patient's mouth to detect minimal respiratory exchange, sticking a pin in him to check for bleeding) as they were developed and became available (e.g. electrocardiography, angiography).(114, at p. 252) Harvey's discovery of circulation and later discoveries of the interrelation between respiration, oxygen, hemoglobin, circulation and metabolism cemented the concept of the association of absence of vital signs, breath and pulse, with death. Of course, some skepticism remained especially in light of the possibility of a delayed spontaneous recovery. There was a fairly widespread fear of being buried alive, even when all detectable vital signs of life had ceased. The practice of holding a "death watch" was intended, in part, to offer a last opportunity for the unresponsive figure on the death bed to show some sign of revival.(102, at p. 32) Likewise primitive alarm systems were developed which were installed in tombs or coffins, to enable

the "deceased," if not dead, to signal watchers and be rescued. The danger of grave-robbing to provide bodies for anatomical study reinforced the custom of the dead watch during the Renaissance. And although time and medical and social progress have dispelled the fear, the custom persists of tapping on the Pope's forehead with a silver hammer to ensure that he is in fact dead.(114, at p. 252) Despite these fears and skepticism, the concept of vital sign death remained largely in place until the beginning of the Twentieth Century.

The notion of cell theory established in the 1830's by Schwann and Schleidel led inevitably to the recognition that different cells had different natural life spans and that, therefore, death could no longer be regarded as a single event uniformly affecting the whole body. A concept first of cell death and then of organ death distinct from the demise of the organism slowly developed.(114, at p. 252) The rate at which cells died and likewise could be resuscitated depended on that cell's susceptibility to hypoxia. Organs died, cell by cell, and eventually reached a point of no return when the integrated function of that organ could no longer return following resumption of oxygen, or resuscitation. Death, then, was no longer identified as the absence of functional lungs and heart but rather the loss of the ability to deliver oxygen to tissues and cells. When the heart and lungs stopped working, oxygen could not be delivered to the body's organs and these organs eventually died, albeit bit by bit and at different times.

As scientists discovered more which broadened our understanding of death, significant advances were being made in how to maintain and resuscitate life. World War I saw the evolution of blood transfusion as a means of resuscitation for victims of hemorrhage and shock. The discoveries made during the years prior to the war of the Landsteiner blood

groups as compatibility factors and of sodium citrate as an anticoagulant realized the hope that blood replacement could remedy blood loss. After the war, poliomyelitis epidemics spawned great interest in tank respirators. In 1918, G.N. Stewart and J. M.Rozoff, and in 1928, P. Drinker and C.F. McKhann developed respirators for those suffering from bulbarspinal paralysis. These respirators were comprised of a chamber that encased the whole body of a patient except his head and neck. Alternating the air pressure within this chamber caused the diaphragm to move up and down, moving air in and out of the lungs. These respirators provided supportive therapy which allowed for an extended (and in some cases indefinite) amount of time for healing.(183, at p. 2211) After World War II, medicine and medical science advanced rapidly, partly, at least, in response to the increased carnage that resulted from the World Wars. In 1956, Zoll etal. described the use of externally applied countershock to terminate ventricular fibrillation.(206) By 1960, mouth-to-mouth ventilation(169) and closed-chest massage(105) had also been described. Methods for controlling cerebral edema were also proliferating.(114, at p. 252) During the Korean War (1950-1953), many new kinds of ventilatory devices were developed which could be attached directly to a tube in the patient's trachea. These new respirators were much lighter, simpler and less expensive than the earlier respirators of the 1930s as a means of providing mechanical assistance to ventilation. It became much simpler to maintain respiration in a person whose own diaphragm had ceased to function.

These advances rendered the concept of vital sign death somewhat archaic. A patient whose respiratory center or diaphragm is permanently destroyed and who is maintained on a ventilator is still alive. A patient whose lungs are permanently destroyed and who is maintained on a blood

oxygenator is still alive. Furthermore, the hypothetical person whose lungs and heart are permanently destroyed but who is maintained on a heart-lung machine would still be considered alive. Clearly, since respirations and pulses could be maintained from without, the lack of spontaneous breathing and heartbeat were no longer easily equated with death. Furthermore, it was now clear that all vital functions do not cease at the same time, nor do the organs which perform these vital functions die at the same time. More troubling was the problem created by resuscitation. Since different tissues and, likewise, organs have different susceptibilities to hypoxia and also resuscitation, the point at which resuscitation was initiated and how well it reversed hypoxia established which tissues would survive and which would not. With the advent of advanced resuscitation techniques, it became possible for the heart and lungs to survive major deprivations of oxygen and for the individual to recover cardiopulmonary function but not necessarily recover the function of other organs which were more susceptible than the heart to the effects of hypoxia. The fragile tissues of the central nervous system, especially, often lacked the requisite resiliency:

> ". . .at least 20% of long term cardiac arrest survivors suffer permanent brain damage . . ., ranging from intellectual and emotional changes . . . and other focal neurologic deficits to the vegetative state and permanent coma." (170)

Thus, it also became apparent that the restoration of vital signs did not necessarily mean a return to being lively or "alive." As the definition of death became more and more obscure so did determining what were appropriate resuscitative measures.

In 1957, Pope Pius XII published an allocution on the Prolongation of

Life. Among the many significant statements contained in this document, two were of special import. The first was that the pronouncement of death was not the province of the church but the responsibility of the physician: "It remains for the doctor . . . to give a clear and precise definition of 'death' and the 'moment of death' of a patient who passes away in a state of unconsciousness." The second point was that there came a time in the course of a patient's disease where the situation was hopeless and death should not be opposed by extraordinary means; in "futile" cases, resuscitative measures could be discontinued and death be unopposed. It was at this time that "modernized, technological" death and associated problems became the subject of increasing general and scientific interest. Historically, this proclamation initiated the surge in concept development, research, application and controversy in the use of the construct "brain death."(104, at pp. 28-29)

During 1959, several groups of French neurophysiologists were involved with research in patients who were in deep states of unresponsive coma, in which the absence of spontaneous respiration necessitated the use of a respirator. The patients were also areflexic. The results of these studies were published by Fischgold and Mathis(64), Jouvet(96), and Mollaret and Goulon(132). The concept of brain death seems to have been introduced by the latter authors who coined the phrase "coma depasse." Some of the patients they studied showed no electrical activity in the brain and were therefore considered to be "beyond coma." Extensive brain damage was found on post mortem examination. Other researchers performed EEGs as well as multiple electrophysiologic recordings from the surface of the cortex and deep structures of the cerebrum such as the thalamus. The finding of absent electrophysiologic activity was considered by these investigators as

confirmation of irreversible nonfunction of the brain.

It became increasingly evident that the critical function was no longer heart and lung activity. Rather, the assertion was made that the activity of the heart and lung, respiration and circulation, maintained the brain and that the heart, lungs and brain were interdependent and the loss of function of any one of these three vital organs caused the irreversible failure of the other two organs leading to death in minutes. It was also increasingly understood that in the past cessation of heartbeat and spontaneous respiration always produced prompt death of the brain, and similarly, destruction of the brain resulted in prompt cessation of respiration and circulation and in this context it was reasonable that absence of pulse and respiration were the traditional and appropriate criteria for pronouncement of death.(194, at p. 417) However, it was also becoming increasingly evident that with the current tools of resuscitation, cessation of heartbeat and spontaneous respiration did not always produce death of the brain and that medical technology could interfere with the interdependence of these vital organs. Patients who suffered from the syndrome of "coma depasse", whose bodies were being maintained with the support of ventilators and other life-support equipment, presented a disquieting paradox to those responsible for their care and to those who were close to them during life. Although these patients were without consciousness or evidence of brain activity, their chests moved up and down rhythmically, their hearts continued to pump oxygenated blood, thereby causing their skin to retain warmth and color, and they produced urine and were physiologically capable of reproduction. While this state of physiologic life did not continue indefinitely, patients with no evidence of brain activity maintained cardiopulmonary functions for as long as 68 days.

Thus, with great advances in resuscitation which were made in the 1950s came an inevitable need to define its indications and its utility.

The 1950s were also a watershed period in another field of medicine; the practice of organ transplantation.[r] In 1947, Dr. David Hume described the removal of a cadaveric kidney and its subsequent attachment to a young woman with postpartum kidney failure (the renal artery and vein were sutured to the brachial vessels). Although the kidney provided temporary dialysis long enough for the woman to recover, Dr. Hume could not achieve other successful cadaver transplants due to rejection. Then, two important observations were made. First, a renal autograft performed in dogs would function normally and denervation of the kidney produced no apparent dysfunction. Second, identical twins would not reject tissue from one another. These observations led to the realization that renal transplantation might be feasible if carried out between identical twins.. On December 23, 1954, Dr. Joseph Murray and colleagues performed a living related donor kidney transplant between two brothers at the Peter Bent Brigham Hospital. Because the two were identical twins, graft rejection did not occur. The transplanted kidney functioned immediately and both brothers were discharged well and in good health some weeks later. Despite the success of this first transplant operation, the immediate clinical impact was minimal because of the obvious limitation of requiring individuals with chronic renal failure to be so fortunate as to have an identical twin. Nonetheless, the notion that diseased organs could be replaced with new ones caught the imagination of the surgical world and was the driving force behind the then, new and rapidly growing field of organ and tissue transplantation.(57, at pp. 507-8)

The next great advancement in the science of transplantation was in

1959 with the use of organs from nonidentical twins and then in 1962 with the development of azathioprine. Since the first living related transplant operation in 1954, the procedure had been used infrequently during the next eight years, (and when it was used it was primarily in identical twins) because of the complications of allograft rejection. However, this changed when Calne and Murray noted that azathioprine was an effective immunosuppressive agent for prolonging survival of canine renal allografts. The drug was then used in the treatment of renal allografts in recipients of nonidentical living related donors and, more significantly, in the recipients of cadaver kidneys with impressive results. Starzl soon thereafter recognized that graft rejection could be reversed by combining high dose prednisone with azathioprine. These two drugs became the cornerstone of renal transplant immunosuppression for the next 15 years. By 1965 and 1966, many transplant centers had begun the human use of heterologous antilymphocytic sera combined with azathioprine and prednisone as a means of inducing graft acceptance in the early posttransplantation course.(57, at p. 510)

Living donor transplantation, as the term implies, requires that a kidney be given to a recipient who is fortunate enough to have a willing friend or relative as a donor. The advent of azathioprine, however, opened the door to the use of cadaveric organs. With the ability to use cadaveric organs came the development of liver and heart transplantation. Not surprisingly it was the medical achievement of transplanting hearts which aroused the most discussion and controversy among both the public and medical communities. As one ethicist writes, "the site of love and the habitat of the soul - celebrated in the poetry and psalms of all ages - had now been replaced by a simple pump. What is man now that the heart had

been reduced to a replaceable muscle? . . .Not only in love poetry but in scripture and religious song, the heart has spiritual as well as physiological importance."(150, at p. 33) So while the surgeons developed their art of cutting and suturing hearts, a procedure they viewed as an obvious "next step" in patient care, society began to question the meanings of life and death.

Throughout the rest of the 1960's, cadaveric organ transplantation was primarily limited to medical centers located in areas of greater population density where there were large numbers of trauma patients with fatal neurologic injuries. By the mid 1960s, with the increasing use of ventilators, improved endotracheal intubation and the development of intensive care units, general surgeons and neurosurgeons were becoming increasingly confronted with the long term management of patients with severe intracranial injuries and absence of spontaneous respiration. At that time, there were no available criteria to determine the probability of neurologic recovery; ventilatory support continued until infection intervened and caused the patient's death. These patients created a great deal of psychological ambivalence among next-of-kin and the medical personnel who cared for them. They also generated interest among those associated with the organ retrieval process. Were these patients dead in some way even though their vital signs were being artificially maintained? Could those patients with "respirator brains" who were "beyond coma" be dead, and if so, how could that be determined?

The first discussions of brain death as synonymous with death of the patient were held at a Ciba Symposium in 1966. At that meeting, Alexandre suggested that organs could be removed from an individual with an intact circulation if there was absolute evidence of brain death which he argued

could be determined by cerebral angiography that displayed the absence of cerebral blood flow.(2, at p. 69) Soon thereafter, the concept of brain death became an actively discussed issue in the United States, but its acceptance did not come easily. In 1968, Henry Beecher assembled the Ad Hoc Committee of the Harvard Medical School to examine the definition of brain death. Their landmark report, "A definition of irreversible coma," is now generally regarded as the "first widely recognized index that current medical concepts about the definition of death were changing."(194, at p. 426) In past times, the Harvard report said, "the obvious criterion of no heartbeat as synonymous with death was sufficiently accurate. . . .[but] this is no longer valid when modern resuscitative and supportive measures are used. These improved activities can now restore 'life' as judged by the ancient standards of persistent respiration and continuing heartbeat. . . . Our primary purpose is to define irreversible coma as a new criterion for death."(54) The report then went on to fix a plurality of tests to determine brain death, so that it could be judged that it was no longer a life being maintained, but only a corpse or only organs if transplant was in view.[5]

Since 1968, the validity of these criteria has been established in several ways. These validations include the substantial morphologic evidence that, when the criteria have been fulfilled, there is widespread destruction of the brain. Richardson has found that the brains of 128 patients meeting the Harvard criteria showed extensive destructive changes.(154) Another validation derives from cooperative studies of the value of EEG and neurologic examination in the determination of complete brain destruction. In these studies, members of the American Electroencephalographic society and of EEG societies in Europe were questioned. Oh the 2642 cases under study, there was no instance of

recovery in a patient who fulfilled the Harvard criteria.(179,180) Furthermore, since 1970, there have been no adequately documented examples in which the Harvard criteria could be considered invalid.(119)

Subsequent to the Harvard Committee's report, various groups in the U.S. and throughout the world have elaborated on the Harvard criteria or formulated other criteria. In 1971, several authorities showed that spinal reflexes including withdrawal movements may persist after complete destruction of the brain which challenged the Harvard committee's requirement of absence of spinal reflexes.(131) In 1972, the Task Force on Death and Dying of the Institute of Society and Ethics and the Life Sciences elaborated by specifying that the Harvard Criteria should not replace the traditional means of determining death but instead should be used to complement it.(154) Between 1970 and 1972, 503 comatose patients from a nine hospital cooperative study were analyzed prospectively for brain death. This study gave definitive criteria, like the Harvard study, but the appropriate interval for reexamination was shortened to six from 24 hours.(11) In 1978, Black reviewed the acceptance of brain death as death. He noted the advancements in technology which allowed less strict criteria to determine total brain destruction but also emphasized that "the entity brain death [should] not be confused with prolonged vegetative existence."(29)

In addition to scientific advancements in the study of brain death, there were also important changes in the legal understanding of brain death following the publication of the Harvard criteria. Before this time, the traditional legal definition of death had been consistent with the prevailing medical concept that death was determined by cessation of the vital functions of respiration and heartbeat. This is reflected in the Common Law

definition of death as stated in the Fourth edition of Black's Law Dictionary published in 1968, "The cessation of life; the ceasing to exist; defined by physicians as a total stoppage of the circulation of the blood, and a cessation of the animal and vital functions consequent thereon, such as respiration, pulsation, etc."(30, at p. 488) But in 1970, the first attempt at state legislation on brain death was enacted in Kansas. The statute established two alternative "definitions of death:" permanent absence of spontaneous respiratory and cardiac function, and permanent absence of spontaneous brain activity. The specific criteria were left to "ordinary standards of medical practice."(154, at p. 52) In 1972, the impact of current medical thinking on case law had become evident in a Virginia case, Tucker v. Lower. In a wrongful death action, it was alleged that an individual was not dead at the time that his heart and kidneys were removed for purposes of transplantation. The court rejected a motion for a summary judgment in favor of the defendants on the grounds that the court was bound by the common law definition of death until it was changed by state legislature (as in Kansas). However, after considerable debate, the court instructed the jury that it might properly consider, as a substitute for the traditional criteria for determining the time of death, "the time of complete and irreversible loss of all function of the brain. . .whether or not the aforesaid functions [respiration and circulation] were spontaneous or were being maintained artificially or mechanically."

In August of 1978, a model Uniform Brain Death Act was adopted by the National Conference of Commissioners on Uniform State Laws in the United States. This act specified that: "For legal and medical purposes, an individual who has sustained irreversible cessation of all functioning of the brain, including the brainstem, is dead. A determination under this section

must be made in accordance with reasonable medical standards." In a comment on the Uniform Brain Death Act, the Commissioners stated that "the act does not preclude a determination of death under other legal and medical criteria , including the traditional criteria of cessation of respiration and circulation."(186, at p. 240)

Another important development was the change in the position of the American Medical Association away from opposition to statutory definitions of death. This opposition was based on a belief that there was no need for such laws. In 1977, this opposition softened and in December 1979, largely as a result of added pressure from organizations representing neurologists and neurosurgeons, this opposition was entirely reversed, and a Model Act to provide for the determination of death was adopted by the AMA House of delegates. The important sections of this act read:

> An individual who has sustained either 1) irreversible cessation of circulatory or respiratory functions, or 2)irreversible cessation of all functions of the entire brain, shall be considered dead. A determination of death shall be made in accordance with accepted medical standards. A physician or any other person authorized by law to determine death who makes such determination in accordance with (the above) is not liable for damages in any civil action or subject to prosecution in any criminal proceeding for his acts or the acts of others based on that determination. (186, at p. 242)

In May 1980, representatives of the American Medical Association, American Bar Association, and the National Conference of Commissioners of Uniform State Laws reached agreement on a Uniform Determination of Death Act. This new uniform determination read:

> An individual who has sustained either 1)irreversible cessation of circulatory and respiratory functions or 2)irreversible cessation of all functions of the entire brain, including the brain stem, is dead. A determination of death must be made in accordance with accepted medical standards.(190)

In 1981, the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research published its book entitled Defining Death. Included in the book were guidelines on how to define brain death as well as criteria for the determination of brain death.[t] By proposing this carefully considered statute, the President's Commission made a valuable contribution to health care policy which endorsed the acceptance of the Universal Determination of Death Act of 1980. It is interesting that the Commission disavowed the need ". . .to resolve all the differences among the leading concepts of death. . ." that influenced it recommendations. The Commission noted that "philosophic refinement beyond a certain point may not be necessary. . ." for the purpose of public policy. The statute rested, therefore, at the level of "generalized physiologic standards" for recognizing death, and avoided a commitment to one specific concept of what it means for a human to die. However, in the section of the report specifically devoted to a discussion of the meaning of death, the Commission seemed to favor the concept of death which focuses on the ability of the organism to function as a whole; to integrate, regulate and organize important organ systems is an organism's essential quality, the irreversible loss of which constitutes death.(203, at p. 252)

Shortly after the publication of the Commission's report, the anencephalic debate commenced and began to question whether the notion of the irreversible loss of bodily integrative ability was really the sine qua

non of death. Were the brainstem reflexes fundamental to what we consider life? Was it time to reexamine the criteria by which we measure death, to reject the whole-brain oriented Harvard criteria in favor of a consciousness and social interaction based scale?

We have traced the evolution of defining the criteria of death and the philosophical and cultural meanings behind those criteria. In general terms, an entity is considered dead when there is a complete change in the status of that entity characterized by the irreversible loss of those characteristics that are essentially significant to it. Throughout history, in various times and cultures, many answers have been given to the question of what is essentially significant to human life. Four basic answers surfaced in this review. Each involves the irreversible loss of some essential characteristic. The four essential characteristics are (1) the presence of the soul, (2) the flowing of 'vital' body fluids, (3) the capacity for bodily integration and (4) the capacity of consciousness and social interaction. The concept of death as synonymous with loss of the soul, although still an important philosophical concept, was displaced within the scientific community when man's understanding of anatomy and physiology challenged religious and spiritual beliefs. The concept of death as synonymous with the loss of the vital functions of respiration and circulation was displaced in 1968 within the scientific community when man's understanding of resuscitative technology and brain function challenged the traditional standards of cardiorespiratory measurements. And now, man's struggle to understand the higher cortical functions of consciousness and thought and to provide appropriate and responsible medical care (i.e. organ transplantation) have begun to challenge the current standards of brain death. Some critics argue that the departure from the concept of "vital sign death" to "bodily

integration death" was not a true revision of the meaning of death but, rather, a revision in the measurement of death since cardiovascular, respiratory, and brain activity are known to be interdependent and that the cessation of one certainly would mean the cessation of the others without invention. The Harvard criteria did not replace but, rather, complemented the traditional criteria for determining death. Where the latter can be clearly established, they are still determinative.(154, at p. 50) Other critics argue that "brain death" was actually a radical departure from the traditional concept of death because the physician no longer was making his decision for the benefit of the patient but rather "for the benefit of the family, society and (in the case of organ transplantation) for another patient."(187, at p. 603) Another critic concluded, "shifts in criteria do not leave everything ethically and legally as it was before. If there are scientific and therapeutic motives for shifting the criteria (for example, to provide more material for research, or more and better organs for transplantation), then it must be the case that under new criteria the person who is dead will be more useful than before."(163, at p. 41)

It is interesting that many of these statements closely resemble the current arguments in the anencephalic debate. The Harvard criteria met with some debate, but eventually forged the path for important statutes and legislation which permitted transplant operations to save countless lives. The anencephalic debate has gradually waned in intensity and has produced no significant legislation and consequently no clinical contributions. Were the Harvard criteria really just a formulation of an alternative way to diagnose the traditional concept of cardiorespiratory death (and thus easier to accept) or were they the radical redefinition of death that the critics mentioned above argue? Has the original intent of the Ad Hoc Committee at

Harvard been maintained over the last 24 years? Did the Ad Hoc Committee consider the anencephalic organ donor and reject it because of its intact brainstem?

IV. A CLOSER LOOK AT THE AD HOC COMMITTEE

The preceding reviews of the anencephalic debate and of death's historical evolution reveals that society and its scholars have reached an unhappy plateau of inertia. Those proponents of a higher brain-based definition of death have been met by immovable supporters of the Ad Hoc Committee's whole brain-based criteria. The anencephalic debate has been tabled in most hospital ethics committees for lack of direction and for fear of negative publicity. Let us now return to the document itself, the Report of the Ad Hoc Committee to Examine the Definition of Brain Death, and to an analysis of papers of the Committee's Chairman, Dr. Henry Beecher. I believe that a careful study of the Committee's intent will provide direction for the anencephalic debate.

The Report of the Ad Hoc Committee to Examine the Definition of Brain Death stated in its first sentence that "Our purpose is to define irreversible coma as a new criterion for death."(54) The authors cited two reasons for the need for a definition: (1) to deal with the burden the irreversibly brain damaged patient inflicts on himself, his family, his medical caregivers, and society and (2) to resolve the controversy which can accompany organ donation for transplantation. The report then went on to outline the characteristics of irreversible coma which included determinations of cerebral, higher brain function (unreceptivity and unresponsitivity) and brainstem function (no spontaneous breathing, no reflexes). However, when speaking of irreversible coma, there was uncertainty regarding the distinction between brain death as opposed to irreversible coma. Likewise it was unclear whether the authors referred

to brain death or cerebral death. Certainly, the inclusion of brainstem reflexes as objective criteria would suggest that the authors attributed significance to the brainstem. But some suggest that since there are no precise and accurate measures of the irreversible loss of consciousness and higher brain function, the Harvard criteria merely provided the safest, closest and most technically precise measurements.(192, at p. 314) In order to understand the true intent of the Harvard criteria, the criteria on which legislation and statutes are based, and upon which the current anencephalic debate hinges, it is important to understand the influences under which the the members of the Ad Hoc committee operated, the questions they hoped to answer, and what they believe their response, in the form of the Harvard criteria, was.

The late 1960's was the setting for the development of two astonishing advancements in clinical medicine, intensive care and heart transplantation. As outlined in earlier chapters, these developments were part of continuums in medical technology and surgical and pharmacologic techniques, but their accomplishments in terms of how they effected the public at large were watershed. Newspapers were filled with accounts of how individuals were having death kept at bay by respirators and intensive care technology and how others were having death kept at bay by the installation of organs to replace their diseased ones. But with the complexities and intricacies of intensive resuscitative techniques came some failures. Families and caregivers kept watch by the bedside of patients with no apparent consciousness or responsiveness but who breathed and whose hearts beat. Were these people still "alive"? With the wonder and awe that transplantation inspired came also a sense of fear. Where were the organs coming from?

Following the first heart transplantation, there appeared in the medical literature and in the popular press a series of articles calling for clarification of the criteria for determining death. Some called for an "updating" of the criteria to facilitate the work of the intensivists (the declaring of death) and to facilitate the work of the transplant surgeons (the taking of organs). Others asked for the establishment of agreed-upon guidelines to protect the integrity of the donor against possible premature organ removal or to protect the physician against possible charges of malpractice, or even homicide.(154, at p. 512) In a widely celebrated article in Harper's magazine, the author asked whether transplantation was not actually a modern twist of harvesting the dead.(89) An editorial in the Wall Street Journal offered this view of the situation:

> "The issue of [defining death] is as deep as the old, near-universal human fear of waking up in a coffin. In recent years, it has acquired newly macabre forms. Mechanical respirators are making it possible to sustain a body's breathing well past its natural point of expiration. This enables people to begin worrying about whether the plug will get pulled on a human who otherwise would have lived to recover some day. The improving technology of organ transplants makes the fear more vivid. Someone will now have a real reason to pull that plug."(200)

In 1957, Pope Pius XII had attempted to sort out some of the confusion over the gray areas of death and resuscitation in an address, "The Prolongation of Life." Some conclusions stand out. (1) In a deeply unconscious individual whose vital functions are maintained over a prolonged period only by extraordinary means, "the soul may already have

left the body." Verification of the moment of death can be definitely determined only by a physician. It is not "within the competence of the Church" to decide this. (2) It is incumbent on the physician to take all reasonable ordinary means of restoring the spontaneous vital functions and consciousness and to employ such extraordinary means as are available to achieve this end. It is not obligatory, however, to continue to use extraordinary means indefinitely in hopeless cases. "But normally one is held to use only ordinary means - according to circumstances of persons, places, times, and cultures - that is to say, means that do not involve any grave burden for oneself or another."(145) The assumptions were made that life is present as long as vital functions persist spontaneously or even with some help from artificial processes and that there comes a time when resuscitative efforts should stop and death be unopposed. This message must have comforted members of the Roman Catholic Church but, no doubt, fear and skepticism persisted.

It was in this setting of great advancements in resuscitation and transplantation (with the consequent problems for hospitals of "keeping alive" people with irreversible brain damage and of accessing organs for transplantation), growing public fear of being buried alive or of having their organs "snatched," and also the radical concept that the soul might have left the body before the heart stopped beating that the Harvard Ad Hoc Committee began its deliberations. Dr. Robert Ebert, the Dean of Harvard Medical School, echoed these influences in the letter in which he proposed the Ad Hoc Committee.

> "At a recent meeting of the Standing Committee on Human Studies, Dr. Henry K. Beecher reviewed some basic material on the ethical problems created by the

> hopelessly unconscious man. His presentations reemphasized to me the necessity of giving further consideration to the definition of brain death. As you are aware, many of the ethical problems associated with transplantation and other developing areas of medicine hinge on appropriate definition. With its pioneering interest in organ transplantation, I believe the faculty of the Harvard Medical School is better equipped to elucidate this area than any other single group."(22, Letter to Ralph Potter from Robert Ebert, February 2, 1968)

The Committee was assembled in February of 1968 and had its first meeting on March 14, 1968. The Chairman of the Committee was Dr. Henry K. Beecher, Dorr Professor of Anesthesia at Harvard Medical School. He was described by former colleague Dr. Ralph Potter as "a medical person with ethical responsibilities, not much philosophical perspective, but a real drive to get things done."(148) Professor William Curran, a member of the Ad Hoc Committee and Professor of Health Law at Harvard Law School, remembers that the primary purpose of the Committee as outlined at the first meeting was to find a solution of "how to deal with the heart attack and trauma patients who were in irreversible coma and were being 'kept alive' much to the concern of hospitals and families."(52) He remembers being told that because there were no criteria for stopping heart-lung machines, a conflict was growing between the caretakers and the "technology movers," the surgeons, that required guidance and resolution. He remembers that the Committee was not created in order "to specifically identify criteria that would increase the supply of organs for transplantation but [they] were meant to consider the issue" during the deliberations. Dr. Ralph Potter, another member of the Ad Hoc Committee, and a Professor at Harvard Divinity

School, remembers that Dr. Beecher was "preoccupied with the public fear of organ snatching. . . . and from the beginning believed that the sooner we could come to some conclusions, the better."(148)

By July 3, 1968, the report had gone through five rough drafts and had been submitted to the Dean of Harvard Medical School and the publisher of the Journal of the American Medical Association. As outlined in previous chapters, within two years the criteria were the basis of state law in Kansas and within twelve years had been incorporated into the Uniform Determination of Death Act. These statutes were certainly derived from the words of the Report, but were they consonant with the intent of the Ad Hoc Committee? What exactly had the Committee hoped to accomplish? How had they responded to the needs of the public, in terms of allaying the fears of "being buried alive"? How had they responded to the medical community in finding a solution for the "irreversibly brain damaged patient," and in facilitating organ transplantation? What did it mean "to define irreversible coma as a new criterion for death"?

After reading the personal papers of Dr. Beecher and speaking with the surviving members of the Ad Hoc Committee, it is my conclusion that the intent of Dr. Beecher and the Ad Hoc Committee was to provide a definition of death that would allay the fears of the public and facilitate organ transplantation. I also believe that Dr. Beecher and the Committee intended a radical redefinition in terms of the organic component of death, i.e. the irreversible loss of higher brain function, but this radical proposition was based on the traditional belief of a non-organic component of death, i.e. the irreversible loss of the soul. Let me examine each of these statements individually.

Dr. Ralph Potter and Dr. Robert Levine, two of Dr. Beecher's former colleagues, have suggested that the familiar themes of fear of being buried alive and of organ snatching figured importantly in Beecher's thoughts. In a letter to Dr. Daniel Callahan, Dr. Beecher wrote, "Just now I am working on an article with the title, 'Fear of Death as a Cause of Death.' An abundance of material is available on this!"(22, Letter to Daniel Callahan from Henry Beecher, April 28, 1971) It seems that he believed these fears would lead to restrictive legislation that would impede if not completely halt the then burgeoning field of transplantation. As he wrote in an unpublished paper entitled "Some Consequences of Death,"

> "The present shortages of organs for transplantation reminds one of the times 130 years or so ago when medical schools were trying desperately to get enough cadavers for teaching purposes. The grave robbers, the "resurrectionists," did their best to supply the demands of the market place. They were inadequate; so the Edinburgh murderers, Burke and Hare, entered the scene. They supplied fresh cadavers on demand, and a new word was coined. It was called getting 'Burked.' The unethical act, murder, led finally to *restrictive* legislation, the Anatomy Act of 1832, a sequence one can often observe when less ethical violations occur than murder.
>
> "When Woodruff set about organizing a skin bank in Scotland, he discovered that under the Anatomy Act of 1832, precipitated by Burke and Hare, it was illegal to proceed. Finally, the need for a skin bank was appreciated and the situation set right by the passage in 1961 of the Human Tissue Act.
>
> "Another example of the *crippling* power of the courts was demonstrated in the 1932 case of a rich man who bought a testicle from a young Neapolitan.

> A surgeon transplanted it with the result that article 5 of the Italian common code of civil rights was promulgated in 1940. This forbade the donation of organs or other parts of the body that could produce a permanent deficiency in the donor. . .A more *enlightened* bill is currently before the Italian Parliament. . .(One wonders if ever there will be a black market in organs.)"(emphasis added)(22)

Another example of misguided legislation that was borne out of the fear of being buried alive and later used to restrict medical advancements was the Massachusetts Grave Robbing Statute of 1814. In 1971, four doctors at Boston City Hospital began a study of the way pregnant women metabolize common antibiotics. The study involved measuring circulating levels of erythromycin and clindamycin in women during and after their pregnancies. "As we thought about it, [one of the researcher remembers], we realized the safest course would be to get pregnant women who were going to have an abortion anyway. There was no reason to think that either antibiotic would be harmful to a fetus - each is widely used - but it seemed wrong to take any chance."(50, at p. 421) The investigators also measured levels of the antibiotics in the aborted fetuses in order to discover not only how the mothers handled the antibiotics but also whether the drugs crossed the placenta and entered fetal tissues. The experiment verified the idea that pregnant women metabolize antibiotics differently than nonpregnant women, and it showed that clindamycin is more effective in crossing the placenta and getting into the fetus than is erythromycin. These were important observations and were published in the New England Journal of Medicine, 7 June 1973. The journal's paper inflamed Boston "right-to-lifers" who were extremely concerned about the fact that the experiment had

depended on the cooperation of women having abortions and on the legal equivalent of autopsies on the dead, aborted fetuses. In July of 1973, Massachusetts State Representative Raymond L. Flynn wrote to Boston City Councilman Albert O'Neil, complaining about inhumane procedures at BCH and other hospitals. He said he spoke for all "right-thinking" people who believe that no abortion should be permitted, regardless of what the Supreme Court says.(50) O'Neil held hearings on the matter a couple of months later. As a result, the district attorney's office was called, and on 11 April, 1974, a Boston grand jury indicted the researchers for an alleged violation of an 1814 Massachusetts grave robbing-law because they had "remove[d] or convey[ed] away a human body or remains thereof."(50) Beecher, like many in the medical profession, found it intolerable that doctors could be accused of grave-robbing.

Beecher believed that this misplaced fear could be the greatest impediment to medical advancements. By developing criteria which defined death despite the presence of heartbeat, but consistent with the Pope's position that the soul had already left the body, Beecher hoped to "define" away this fear. After all, if the soul had left the body and there was no hope in returning to a sentient life, there could be nothing frightening about the use of one's cadaver organs. In a letter from Professor Curran who wrote,

> "The efforts to get a new definition of death are now too closely associated with the desire and need for donors for single organ (or vital organ) donations for transplantation. In the public eye, this smacks of 'organ snatching' and balancing of one life's value over another. To switch the argument over to a need

> for scarce hospital beds, or for scarce personnel to work on sicker people, or for scarce respirator time, is merely to make the same argument: that this person's life has become less valuable than some undefined other person's life or community interest."(22, Letter to Henry Beecher from William Curran - January 5, 1970),

Beecher circled every word "life" and wrote in the margin "But the basic premise is that the man is DEAD." Beecher developed further this idea in another unpublished paper entitled "The New Definition of Death, Some Opposing Views,"

> ". . . it makes no difference at all which criterion of death is chosen, . . ., but the freedom to choose brain death is a great gain. While it makes no difference to the dead man, it is fraught with material advantages for the others concerned."(22)

The material gains Beecher wrote of included not only the benefits to families of allowing them to end their deathwatches but also the obvious benefits of transplantation. Leon Kass in a letter critiquing one of Beecher's papers wrote, "The family naturally responds on the dictum 'where there is life, there is hope.' Thus, to simulate the existence of life where none exists, to artificially perpetuate some of the signs of life in a corpse, is a cruel and senseless perpetuation of suffering for the family. Moreover, the family is delayed and prevented from regrouping and reconstituting itself in the face of loss. Most families will be greatly relieved to have death honestly and properly declared." To which Beecher wrote in the margin, "our experience", "exactly."(22, Letter to Henry Beecher from Leon Kass - May 20, 1970)

Let us examine the significance of Beecher's intent. Can the mere

formulation of a definition of death allay fear? Is the doctor-patient relationship such that if a physician declares Aunt Matilda dead, her family will not challenge that diagnosis? Has there ever been a request for a second opinion when death is the diagnosis? Perhaps, as Beecher suggests, the family, society, and certainly transplant recipients are ready to acknowledge that "for all intents and purposes" Aunt Matilda is dead, their responsibility to her and her responsibility to them is concluded, her usefulness to herself and to others is ended. One can imagine instances when a definitional change would be more difficult to accept; if the definition is preposterous or if the definition is acceptable but the family or society is not ready to acknowledge the conclusion of that person's utility, for example, a primary provider/parent/spouse or an important statesman (Robert Kennedy was by current definitions brain dead for several hours before cardiorespiratory failure caused his demise). This assertion that definitions can allay fear was a radical departure from the role of physician-scientist and was an important contribution not only to medical policy-making but also to understanding the physicians role in creating death's threshold.

On the subject of transplantation, Beecher was perhaps even more taken with the benefits of the brain death criteria than other proponents. In the rough draft of an unpublished paper, he wrote,

> "One can hear on all sides "reasons" for the definition of brain death as death indeed. Those hostile to the concept state, without evidence, that the primary motivating interest was to increase the flow of organs for transplantation; this is one reason, one of several. Since I was actively engaged in formulating this definition, I am familiar with the reasons for its presentation. There is <u>first</u>, the widely recognized

> inadequacy of the old definition of death, and second, with the advances in science and technology, it has become evident that there is a need to redefine death in light of these advances. Third, there is indeed a life-saving potential in the new definition, for, when accepted, it will lead to greater availability than formerly of essential organs in viable condition, for transplantation, and thus countless lives now inevitably lost will be saved. . . .The philosophers say acceptance of the new definition is the camel's nose under the tent. Thus they put a vague philosophical view against the here and now of a needless loss of uncounted hundreds of lives which might be saved or at least prolonged by the use of the organs from a body whose brain is dead. This costs nothing to the former 'proprietor' of the organs, but it gives life to those in need of new organs. . .Finally, the present situation points up a momentous change of view: until now the dead body has been an unpleasant problem, unclear, a dangerous source of disease and if not buried properly, likely to come back and haunt you. But now, a new era is at hand: for the first time, the human body of the newly dead has great potential usefulness."(22)

From these statements, it is clear that Beecher rejected slippery slope arguments. He also seems to favor "greatest good" calculations, maximizing health and happiness. He actually scorned the opinion that the transplantation issue should not enter in the deliberations of defining brain death criteria. This utilitarian orientation is echoed in many of his writings:

> "The new definition will lead to saving countless lives. Isn't this morally desirable? Denial will lead to loss. . . We can be intellectually lazy - morally lazy - and avoid controversy by rejecting the new definition, simply saying the first two reasons [cited

> above] are O.K., but why bother. The third reason is a spur to acceptance. I, at least, am a pragmatist. (things are what their results are)"(22)

In another rough draft, he elaborates on his opinion that wasted therapy is immoral.

> "It is odd that some have considered it indelicate to contemplate the material advantages to arise from the new definition. The hope, the relief of anxiety of the desperately ill and their families is great on being informed that the organ needing replacement is available. The freedom to use tissues and organs in good condition means, on one hand, the saving of lives, and on the other, the elimination of waste, wasted skill and time and resources and needed bed space, waste of money and waste of lives."(22)

These statements were as radical as the assertions that policy-makers could define away fear. To acknowledge openly and to insist that transplantation was as an important influence in defining death as was being sympathetic to the needs of the patient and of his or her family was a radical readjustment in viewing the American ideals of "life, liberty, and the pursuit of happiness." If we take Beecher at his word, we are to believe that there comes a time toward the end of one's life, where the patient's life is less valuable than his organs; in a sense Beecher advocates a theory of diminishing returns or diminishing utility. This is a negation of the absolute value of "life" and of Kantian ethics, no longer can a patient be viewed solely as an "ends".

Thus, it is clear that Beecher was very concerned about facilitating transplantation, more so than fellow members of the Ad Hoc Committee. But according to Ralph Potter, "The Report was always

Henry's, not really a product of the Committee. It was his show and he ran it. How else could you get thirteen people to agree on such a big issue and publish a paper in five meetings, in five months."(148) There does, however, seem to be more of a consensus on what the Committee intended when it defined irreversible coma - they intended, unlike its legacy, for brain death to be equated with higher cortical, cerebral death.

Professor Curran remembers,"There was no discussion of cerebral vs. whole brain death. We were more practical, mostly a bunch of clinicians. We were concerned with a symptom - irreversible loss of consciousness. We would have included PVS [persistent vegetative state] and anencephaly but we just didn't think about them. We were more concerned with the tragedies of life not death."(52) In a letter to Beecher dated April 22, 1968, Curran writes, "I feel we should limit our consideration to the following: A complete and comprehensive set of guidelines for the determination of irreversible brain damage resulting in virtually total destruction of the personality and total unconsciousness."(22, Letter to Henry Beecher from William Curran - April 22, 1968) Beecher elaborates further in an unpublished paper,

> "The basic question is this, are these hopelessly comatose patients really still alive? And the answer hinges on whether one holds with Black's Law Dictionary that '. . . death occurs precisely when life ceases and does not occur until the heart stops beating and respiration ends. Death is not a continuous event and is an event that takes place at a precise time, ' or whether one believes that the individual's personality, his conscious life, his uniqueness, his capacity for remembering, judging, reasoning, acting, enjoying, worrying, and so on, reside in the brain, and that when the brain no longer

> functions the individual is dead. We have proof that these and other functions reside in the brain, . . .It seems clear that when the brain no longer functions, when it is destroyed, so also is the individual destroyed; he no longer exists as a person: he is dead. In the words of Justice Holmes, 'To live is to function. That is all there is to living.'(22)

Beecher reiterates the importance of consciousness and personality in two other unpublished papers. "There is a new need to move death to the site of the individual's consciousness, and if loss of consciousness be permanent, then to declare death."(22) "Advances in medical knowledge and understanding require the orderly recognition that destruction of the brain means death of the individual; his uniqueness is centered in the brain."(22) And in a letter written a year and a half after the Ad Hoc Report to Dr. Robert Ebert, Dean of the Harvard Medical School, "Our definition of irreversible coma has been astonishingly widely accepted, as you doubtless know. . . accepted as a definition of the irreversible termination of the personality, death of the brain, death indeed."(22, Letter from Henry Beecher to Robert Ebert - December 22, 1969) In a letter where Robert Veatch comments,"I believe that Dr. Beecher sees the meaning of death as the loss of consciousness," Beecher writes in the margin, "no, loss of consciousness is the result of death."

To change the definition of death to a higher brain-based standard was the most radical of Beecher's intentions. Under this definition, the personality of a patient may be irreversibly lost but the appearance of life remains; "cadavers" and "corpses" can breathe and have heartbeats. Beecher asserts that what is meaningful in society are not the appearances of life but rather substantive, sentient, interactive life.

This is a restatement of his utility based diminishing returns concept of life, where utility is measured by personality and consciousness. This is a far cry from measurements of pulse and respiration but perhaps a closer approximation to Cartesian dualism and a soul oriented concept of life and death.

V. THE ANENCEPHALIC DEBATE REVISITED

At this junction let us return to the anencephalic debate with an understanding of the original intent of the brain death criteria. Beecher and the Ad Hoc Committee hoped to allay fears of organ-snatching, to facilitate organ transplantation and to redefine death to mean the irreversible loss of higher cortical function. Clearly, if the the intent of the Harvard report had been maintained, there would be no anencephalic debate, they would be appropriate donors. There is little public fear in harvesting the organs from an anencephalic, rather if anything there is pressure from families to use their anencephalic infants' organs in order that they can derive something positive from a tragic situation. The slippery slope argument against using anencephalics as organ donors is rejected under the "intended" Harvard criteria in favor of a "greater good" or "diminishing returns on utility" focus. And most importantly, the definition of death under the "intended" Harvard criteria includes those who have irreversibly loss sentient life. Since the anencephalic never achieves sentient life, they meet the criteria of death and their cadaver organs can be used for donation. Indeed, although many attest that neither Dr. Beecher nor the Harvard Committee ever discussed the anencephalic infant, it seems that Dr. Beecher anticipated the debate.

> "There are many levels of death: civilizations can fail, yet the component societies live on. Societies disintegrate, but individuals survive. Individuals die, yet their cells continue to metabolize. . . Cells can be disrupted, yet their ferments remain active. Where in this sequence are you going to say death occurred?

> (Sir Peter Medawar surveyed this situation years ago and concluded that man was truly dead who could not rise up and litigate.) *At whatever level we <u>choose</u> to call death, it is an arbitrary decision*. Death of the heart? The hair still grows. Death of the brain? The heart may still beat. The need is to choose an irreversible state where the brain no longer functions. *It is best to choose a level where, although the brain is dead, usefulness of other organs is still present*. This, we have tried to make clear in what we have called the new definition of death."(emphasis added)(22)

Furthermore, Beecher and the Ad Hoc Committee would have found no dilemma in using the anencephalic donor because, as stated above, these infants would never have been invested by a soul when measured by the standards of the Catholic Church (the soul is the site of reason, logic, empathy, etc.). The authors held to the classical notion that both an organic component (called the body) and a nonorganic component (called the soul) must be present for a human to be alive. They, in fact, echoed the insights of Descartes, that it is not the whole brain that it is the locus of the most critical functions of the soul, but only a small part of it. In the margin of a paper by Robert Veatch who wrote about "the 'sacred character' of individual existence," Beecher wrote "as Pius XII so clearly said 'Extreme Unction when the soul has fled. The soul and mind are one!"(22)

Thus, we are left with the disquieting question of why statute, law and practice have strayed from the original intent of the Harvard Ad Hoc Committee and yet their report is defended to the letter. It is clear from the preceding analysis that Beecher and the members of the Ad Hoc Committee believed and intended that death should be declared when

there is permanent loss of consciousness, loss of cortical function. It appears that the brainstem was included in the definition of death to provide a "safety margin" both for the patient, to be sure of the permanence of the loss of cortical function, and for society, to create a bridge to the traditional criteria of loss of heartbeat and breath. It seems likely that society was (and is) not ready to accept that bodies that breathe and whose hearts beat despite their irreversible loss of soul, personality and "humanness," were ready for burial or organ donation. The fear of being buried alive may still supersede any rational appraisal of the "meaning" of death.[u] But if we consider the anencephalic issue, there is no need for a safety margin, the brainstem is irrelevant to the anencephalic because there is no question of "loss". The anencephalic never achieves consciousness or personality. Therefore, society needs to reanalyze the anencephalic issue not in terms of the restrictions of the Harvard criteria but in terms of their intent.

I propose that in light of the preceding thesis either of the following policy proposals could be endorsed. (1) The current definition of brain death as outlined in the UDDA is maintained but an exception is stipulated for anencephalic infants *given their inability to achieve any state of consciousness or awareness.* (2) The current restrictions to organ donation are maintained as outlined in the UAGA but an exception is stipulated for anencephalic infants *given their inability to achieve personhood.*

NOTES

[a] I am indebted to Richard Wolfe of the Frances Countway Library at Harvard University Medical School for assisting me in accessing Dr. Beecher's papers.

[b] The issue of "experiencing pain" is an important one in the care of anencephalic infants since the use of anesthetic agents may eliminate the subcortical responses to pain but are not necessary to minimize or prevent suffering and may delay or alter "brain death" determination.

[c] There is some evidence, however, that suggests that the increases in prenatal detection of anencephaly will mean a sharp drop in the availability of these donors as more women will choose to terminate such pregnancies. For example, in California about 50% of all pregnancies are screened during the second trimester, and approximately 95% of the detected anencephalics have been electively aborted.(177, 124)

[d] The Loma Linda Medical Center trial is significant because it was the first and only trial of using anencephalics as organ donors in the United States. On December 18, 1987, Loma Linda released its protocol which set forth the guidelines under which such infants could be utilized as donors in a manner consistent with applicable brain death statutes. Under the protocol, babies born with anencephaly would be sustained with a respirator for a maximum of seven days. During that period, doctors would remove the respirator every twelve hours in order to determine whether brain death had occurred. To avoid any conflicts of interest, such a

determination would be made by two Loma Linda physicians unaffiliated with the transplantation team, and, if necessary, an outside consultant would confirm the findings. This artificial ventilation preserved the baby's organs in a condition suitable for transplantation, so that if brain death did occur during the prescribed period the organs could be immediately used. Finally, in order to ensure proper respect for the newborn, the protocol specified that babies who were not yet brain dead at the end of seven days would have their life support discontinued and be allowed to die.

[e] On February 19, 1986, California State Senators Marks, Nielsen and Rosenthal introduced a bill to amend sections of the California Health and Safety Code, the sections representing California's adoption of the UDDA. The proposed amended sections read as follows:

> "(a) An individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions, or (2) irreversible cessation of all functions of the entire brain, including the brain stem is dead. *Additionally, an individual born with the condition of anencephaly is dead.* (emphasis added) A determination of death must be made in accordance with accepted medical standards.
> (b) "Anencephaly" . . . . means markedly defective development of the brain, together with absence of the bones of the cranial vault and the cerebral and cerebellar hemispheres, and with only a rudimentary brain stem and some traces of basal ganglia present."
> (Cal. S. 2018 (1986))

The introduction of the bill in the California State Legislature created a storm of controversy, questions and uncertainty. Due to the confusion and consternation surrounding the bill, Senator Milton Marks, its primary sponsor, eliminated the proposed substantive changes in the

determination-of-death law. In its stead, the legislature passed an amended version of the bill that merely required a state panel to examine the legal, medical and ethical issues pertaining to the original proposal.

[f] A similar bill permitting organ retrieval from anencephalics was also introduced in the New Jersey State Assembly. In contrast to the California bill, which focuses on modifying the definition of death, the New Jersey version seeks to achieve the same result by amending that state's adoption of the UAGA. The bill provides:

> "A parent of an anencephalic infant, either prior to or upon the birth of that infant, may submit to the attending physician or surgeon a written request for the donation of the body of that infant, or a part thereof, to any of the donees for any of the purposes stated in section 3 of the [UAGA]. . . to which the attending physician or surgeon shall consent in writing if the requested donation is medically suitable of purpose and safety, and if one of the parents does not object to the donation, *regardless of whether the infant has sustained an irreversible cessation of circulatory and respiratory functions or an irreversible cessation of all functions of the brainstem.*" (emphasis added) State of N.J. Assembly Bill No. 3367 (1986)

[g] From the standpoint of criminal law, the issue of when life commences is very important. The law of homicide requires that the victim be a living human being. In common law, the killing of a fetus was not homicide unless the fetus had been "born alive." Being born alive required that the fetus be totally expelled from the mother and demonstrate "a clear sign of independent vitality," such as respiration, although respiration was not strictly required. In the United States, the "born alive" requirement has come to mean that once the fetus is "fully brought forth" from the body of

its mother it is considered a human being. This conclusion is supported by Roe v. Wade, which implies that live birth is both a necessary and sufficient condition for the existence of human life to which homicide laws might attach. Since the portions of the anencephalic's brain that control breathing are intact, these infants are capable of spontaneous respiration. Thus, upon birth they qualify as "human beings" under the relevant homicide statutes.(72, at pp. 924-5)

[h] Punishment for child murder in medieval Europe, when meted out at all, was usually directed at (often unwed) mothers on the lower end of the socioeconomic scale and took cruel forms. A notable example was the practice of "sacking," in which the infanticidal mother was put in a sack and submerged in water for six hours, while a choir stood by and sang Psalm 130, "Out of the depths I cry to Thee."(202, at p. 11)

[i] Guidelines for the determination of brain death in newborns without anencephaly are still not well established. The major reasons for hesitation in making this determination have included "(1) experience that suggests that guidelines for brain death in adults are not applicable to newborns, (2) insufficient data in the literature to make the drafting of official guidelines for newborns appropriate, (3) fear of misinterpreting a reversible absence of function due to immaturity as brain death, and (4) the fact that most brain injuries occur unobserved either prenatally or during labor, with unknown severity, and may therefore lead to (5) an uncertain prognosis."(142, at p. 349)

[j] Richard Zaner rejects the "slippery slope" as a legitimate argument.

His basis for this position is based on two premises - (1) that the logic of the "slippery slope" is fallacious and (2) that the foundation of the slippery slope is the "fear" about a "tendency" that researchers and physicians will abuse and misuse their powers. To explain the fallacy of "slippery slope" argumentation, Zaner points out, "If the first step is accepted, the evil at the slope's bottom is inevitable. This is a version of affirming the antecedent, and from this no conclusion whatever follows. In some versions. . . ., the logical fallacy of denying the consequent is also committed: the evils which will result must be rejected; therefore, not even the first step should be permitted. Again, no conclusion follows."(204, at p. 207) In regards to the second premise, Zaner elaborates, "At its root is a certain psychological observation, coupled with an appeal to fear: once people become accustomed to something they find it easier, perhaps even attractive, not only to do it again and again (developing a habit) but also [to] engage in a different but related activity which, however, is bad. Examples include welshing on a promise, not telling the truth, fudging on getting consent, etc."(204, at p. 208) The focus of the argument then, is on the people doing the action, not on the action itself (nor the technical means or definitions required by the action). "[T]he slippery slope has its force mainly in the distrust of persons - they are not able to resist the temptations to continue each step down the slippery slope all the way to the bottom. For each step down differs so little from the prior one that we are easily duped; the first was okay, so the second seems okay as well. . . ." Zaner considers the argument an illicit appeal to distrust, suspicion and fear and rejects it because he believes that the psychological observation is at best dubious in most cases and that the tendencies or temptabilities of most people are at best presumptive and hardly the grounds upon which

to build an argument for "moral prohibition."

[k] Among the 15 criteria Joseph Fletcher lists that form a composite picture of man are minimal intelligence ("any individual. . . who falls below the I.Q. 40-mark. . . is questionably a person; below the 20-mark, not a person") and neocortical function. ("In a way, this is the cardinal indicator, the one all others are hinged upon.").(66, at pp. 1, 3)

[l] The Peel Commission Report, issued in 1972, defined a "previable" fetus as follows: "one which, although it may show some but not all signs of life, has not yet reached the stage at which it is able, and is incapable of being made able, to function as a self-sustaining whole independently of any connection with the mother." Presumably, heartbeat and respiration are prominent examples of "signs of life" that, although present, are not sufficient to confer viability on a fetus which cannot "function as a self-sustaining whole" independent of the mother. This definition clearly points to the case of a very immature fetus *ex utero*, which cannot be sustained under present technology. Such a fetus, although it may be able to breathe without assistance, is nonviable because it cannot become a stable organism and hence faces imminent death. Under this definition, anencephalics are also nonviable despite their ability to breathe on their own and to maintain a heartbeat. Since their respiratory function will soon begin to deteriorate due to the lack of a developed brain, they too face imminent death and are therefore nonviable.(143)

[m] If neocortical functions - the capacity to think, feel, communicate, or experience our environment - are the key to human life, then the loss of

neocortical functions should be the key to human death. If the irreversible loss of an organism's essentially significant attributes are the capacity for consciousness and higher cortical functions rather than for autonomic bodily integration, then people who have lost these distinguishing features of human life should be treated as dead.

[n] Anxiety over a possible irrational backlash generated by a "gut feeling" should not be dismissed lightly, since societal attitude is a crucial factor in the success of any effort to increase the supply of transplantable organs. A 1987 Gallup poll revealed that among people who were aware of organ transplants 82% were very or somewhat likely to donate the organs of their deceased loved ones, yet the number willing to donate their own organs was at 43%. These numbers are interesting when compared to a 1985 poll which found that 53% of those surveyed would donate the organs of a relative who had just died but only 50% were willing to donate their own and only 47% felt that removal of organs on declaration of brain death is appropriate.(117, at p. 3111) The two reasons most frequently given as "very important" for the reluctance by most to sign donor cards were: "They might do something to me before I am really dead" (23%) and "I'm afraid the doctors might hasten my death if they needed my organs" (21%). Clearly these results suggest that many individuals do not fully understand that a declaration of death (synonymous with brain death) is required before organs can be removed for transplantation.

[o] It is for this reason that many Catholic thinkers believe that an anencephalic does not have a human soul.

[p] It is interesting to note that as human societies have become more sophisticated, particularly in recent times, the traditionalistic eschatologies have begun to lose their import. Medieval concepts of death and judgment are not as meaningful, and beliefs that inspired some of these images and traditions have been forgotten or abandoned. The elaborate funeral processions are gone, except for a dignitary of state.The shrines are gone, funerals are streamlined, having only a simple procession sometimes limited to the family. Cemeteries are no longer elaborate nor art-filled. Instead they are landscaped lawns with simple flat markers, no monuments, no mausoleums, no obelisks.

[q] It is interesting that in ancient times, and until the time of Bacon in the Seventeenth Century, medicine was conducted under three rules: to relieve suffering, to attenuate disease and to refrain from treating those who were hopelessly ill.(5) Dealing with hopeless illness, it was thought, would tend to disparage medicine and could lead to charlatanism. As society became more secular and more interested in this life than in eternity, the physician's obligation to sustain life evolved, and was well established by the end of the Seventeenth Century.(113, at p. 1466) In fact until the early Nineteenth century, the Church advised the dying to avoid doctors since they would provide such things as opium which would "impair" preparations for death and making peace with God.

[r] The history of <u>attempted</u> transplantations can be traced back to the Third Century A.D. when two Roman brothers tried to replace the gangrenous leg of a church elder with a healthy leg from a dying Felician Moor. In the Sixteenth Century, the Italian physician Tagliacozzi was consulted by a

nobleman who wanted his nose, destroyed by syphilis, to be replaced with the nose of a slave. Tagliacozzi declined, however, because the "singular character" of the individual would be violated by such a procedure.(81, at p. 1012)

[s] The Harvard criteria as outlined in the report require that neurologic examinations disclose:

(1) Unreceptivity and unresponsitivity to external stimuli. Stated simply, this means that the individual does not show any signs of awareness of external stimuli, e.g. sound, touch, pain, etc.

(2) No movements or breathing. In other words, the only motion observed in the body is that which is produced by external manipulation; even breathing must be done by machine.

(3) No reflexes. Even severely ill or injured persons will demonstrate reflexes in the concentration of the pupils, for example, if there is sufficient life in the brain. This may be true even when the patient is entirely unconscious.

(4) Flat encephalogram. An encephalogram measures through sensors attached to the skull, the minute electrical activity associated with the living brain. A flat encephalogram refers to the straight line produced on the instruments recording paper when there is no wave activity at all.

(5) No drug intoxication or hypothermia. These have been several reported "recoveries" from what was believed to be "irreversible" coma when either of the above was the cause of the patient's condition.

(6) Persistence of these conditions for 24 hours.(54)

[t] These criteria differed from the Harvard criteria only in that spinal

reflexes were not included in the President's Commission's report and the list of contraindications to certification of brain death was broadened to include presence of neuromuscular blockers, CNS infections and metabolic encephalopathies.(149)

[u] Following a British television program in 1980 that suggested that not all organ donors were in fact dead at the time of donation, thousands of potential donors tore up their consent cards.(10)

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